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OIL AND GAS DEVELOPMENTS
IN PENNSYLVANIA IN 1987

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OIL AND GAS DEVELOPMENTS IN PENNSYLVANIA IN 1987



**John A. Harper
Cheryl L. Cozart**

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COVER: "Colonel" Edwin L. Drake (right) and his good friend Peter Wilson, a Titusville pharmacist, in front of the historic Drake well in 1861. This was the second derrick and engine house; the first burned in 1859, and there is no photographic record of it. Photograph by John A. Mather, courtesy of the Drake Well Museum, Titusville.

OIL AND GAS DEVELOPMENTS IN PENNSYLVANIA IN 1987

by John A. Harper and Cheryl L. Cozart
Pennsylvania Geological Survey

PENNSYLVANIA GEOLOGICAL SURVEY

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OIL AND GAS DEVELOPMENTS IN PENNSYLVANIA IN 1987

by

John A. Harper and Cheryl L. Cozart

ABSTRACT

Oil production in Pennsylvania totaled 3,301,763 barrels in 1987, a 13 percent decrease from 1986 production. Oil reserves decreased 7 percent, from 49,223,000 barrels in 1986 to 45,921,000 barrels in 1987. Leading counties for production of oil were Warren, Elk, McKean, and Venango. In 1987 secondary recovery of oil in the Bradford field accounted for only 14 percent of the state total.

Gas production increased 2 percent, from 159,889 million cubic feet in 1986 to 163,318 million cubic feet in 1987. Gas reserves decreased 2 percent, from 2,053,536 million cubic feet in 1986 to 2,012,673 million cubic feet in 1987. Stored recoverable gas decreased slightly, from 585,812 million cubic feet in 1986 to 585,543 million cubic feet in 1987.

The price for crude oil and oil products increased slightly during the first half of 1987, but eventually declined so that the price in December was the same as the price in the beginning of the year. The price of Penn Grade Crude oil started the year at \$16.00 per barrel and ended the year at \$16.00 per barrel. Most new-gas prices were subject to Natural Gas Policy Act price ceilings. The well-head price of one thousand cubic feet of natural gas ranged from a low of \$0.25 under old contracts to \$6.50 for "tight" gas (NGPA Section 107, High-Cost Gas). The average price for gas was about \$2.25.

The total number of wells reported drilled in 1987 was 2,085, a 29 percent decrease from 1986. Total footage drilled was 5,709,665 feet, a 31 percent decrease. The total number of oil wells reported was 944, a decrease of 12 percent over the 1986 figure of 1,077. The most active county for oil well drilling was Warren, accounting for 77 percent of all oil wells drilled in the state. A total of 996 gas wells was reported in 1987 for a 38 percent decrease

from 1986. The most active counties for gas well drilling were Indiana, Armstrong, Clearfield, Crawford, and Erie, accounting for 57 percent of all gas wells drilled in the state. There were 9 combination oil and gas wells reported in 1987, a decrease of 84 percent over 1986. Most of these wells were drilled in Erie, Potter, and Warren Counties.

Development drilling in 1987 decreased 30 percent, to 1,937 wells. Exploratory drilling decreased by 26 percent in the same period, from 103 wells reported in 1986 to 76 wells reported in 1987. The success rate for development drilling was 98 percent; it was 74 percent for exploratory drilling.

Seismic exploratory activity increased by 71 percent, from 4.39 crew-months in 1986 to 7.5 crew-months in 1987. Seismic crews operated in seven counties in Pennsylvania during the year.

Project activity within the Oil and Gas Geology Division of the Pennsylvania Geological Survey in 1987 included continued updating of the oil and gas base map series, completion of a study of Pennsylvania's oil and gas reservoir rocks, and the initiation of two new projects dealing with source-rock geochemistry and coal-bed methane resources.

INTRODUCTION

This annual report of oil and gas drilling and production in Pennsylvania is based for the most part on drillers' well records and location plats filed with the Bureau of Oil and Gas Management, Pennsylvania Department of Environmental Resources. The statistics of oil and gas drilling are compiled only from the records received during the calendar year. This includes records of wells drilled prior to, but reported in, 1987; it does not include 1987 wells for which records were submitted to the Commonwealth after December 31, 1987.

ACKNOWLEDGEMENTS

Grateful acknowledgement is extended to the following industry and government organizations, without whose help this report would have been impossible: the American Gas Association; the Appalachian Oil Scouts Association; the Penn Grade Crude Association; the Pennsylvania Economic Development Partnership; the Pennsylvania Department of Environmental Resources, Bureau of Oil and Gas Management, and Bureau of Forestry, Division of Minerals; and the U.S. Department of Energy.

Statewide crude oil production and reserve figures are published courtesy of the Penn Grade Crude Association of Bradford, Pennsylvania. Ms. Mary Ann Gross, Equitable Gas Company, supplied statewide data on natural gas production and reserves.

Special thanks go to all of the operators, companies, and personnel of Pennsylvania's oil and gas industry who provided data on producing formations, intervals, drilling costs, oil and gas prices, and other miscellaneous information throughout the year.

The following staff members of the Oil and Gas Geology Division, Pennsylvania Geological Survey, are acknowledged: Christopher D. Laughrey, who assisted with the compilation of the basic well data and the deep-well summary tables; and Lajos J. Balogh, who drafted the figures.

PRODUCTION AND RESERVES

CRUDE OIL PRODUCTION

Pennsylvania's crude oil industry produced 3,301,763 barrels (bbl) of Penn Grade crude oil in 1987, a 13 percent decrease from the 1986 production total of 3,783,087 bbl. Most of this production was from Upper Devonian and Lower Silurian reservoirs, but there was probably some subsidiary production from Pennsylvanian and Mississippian reservoirs. Lower Silurian Medina Group sandstones in Erie and Crawford Counties produced 134,580 bbl of crude oil, a decrease of 18 percent over the previous year. See Figure 1 for a summary of these statistics.

Figure 2 illustrates the amount of oil produced and the total number of producing oil wells in Pennsylvania in 1987, by county. The leading counties for oil production during the year were Elk, Warren, McKean, and Venango, in that order. These

Figure 1. *Crude oil production in Pennsylvania, 1987.*

<i>Penn Grade oil¹</i>	<i>1987</i>	<i>1986</i>	<i>Percent change</i>	<i>Cumulative to 12/31/87</i>
Shallow oil ²	3,167	3,619	- 13	1,328,200
Deep oil ³	135	164	- 18	1,758
TOTAL OIL	3,302	3,783	- 13	1,329,958

¹In 1,000 barrels.

²Shallow oil: from Late Devonian or younger rocks, generally less than 2,000 feet deep.

³Deep oil: from Lower Silurian Medina Group.

four counties were responsible for 88 percent of the total oil produced in Pennsylvania.

DEVELOPED CRUDE OIL RESERVES

Developed crude oil reserves in Pennsylvania totaled 45,921,000 bbl at the end of 1987. This figure represents a 7 percent decrease from the 1986 total of 49,223,000 bbl. The areas having the highest oil reserves in the Commonwealth included the fields of McKean, Elk, and Potter Counties, the "middle district" (Venango, Forest, and Clarion Counties), and Warren County. Economically recoverable reserves declined in all areas, however, due to the general impact of low prices, and the federal injection-control law. Figure 3 shows crude oil reserve statistics by shallow and deep reservoirs.

ENHANCED OIL RECOVERY

Pennsylvania's oil industry reported 53 new fluid-injection wells and 11 new core test wells in 1987. The core test wells may be used for stratigraphic purposes, for analyzing reservoir rocks for their geologic and engineering characteristics prior to fluid injection, or for analyzing the reservoir during or after fluid injection to see how well the enhanced oil recovery techniques are working. Elk County had the most enhanced oil recovery wells in 1987, including 50 water-injection wells and 5 core test wells. In addition, Warren County reported 3 gas-injection wells, McKean County had 5 core test wells, and Washington County had 2 core test wells.

The Bradford field in McKean County is the first field in which large-scale, intentional waterflooding was attempted. Flooding probably began by accident sometime in the late 1800's, and intentional

Figure 2. Oil wells and crude oil produced in Pennsylvania in 1987 and 1986, by counties.

County	Crude oil production (barrels)		Number of producing oil wells	
	1987	1986	12/31/87	12/31/86
Allegheny	58,052	70,420	213	233
Armstrong	10,169	7,589	96	75
Beaver	19,463	37,184	99	95
Bradford	174	0	1	0
Butler	60,574	60,350	538	535
Clarion	28,564	28,649	279	269
Clearfield	1,133	869	12	10
Crawford	108,193	145,029	90	252
Elk	727,478	710,545	35	34
Erie	22,193	15,825	135	121
Fayette	148	35	2	2
Forest	160,392	205,188	441	489
Greene	23,265	23,966	360	355
Indiana	5,746	6,723	329	283
Jefferson	3,436	4,609	82	74
Lawrence	66	100	2	2
McKean	422,267	664,717	5,846	6,894
Mercer	12,535	10,464	196	159
Potter	14,401	13,841	69	67
Venango	383,051	504,338	1,720	1,705
Warren	711,818	759,919	2,388	2,292
Washington	72,989	93,115	238	251
Westmoreland	24,228	14,226	84	74
Unknown	96,680	41,966	—	—
TOTAL	2,967,015	3,419,667	13,255	14,271

Figure 3. Crude oil reserves in Pennsylvania, 1987.

Reserves ¹	1987	1986	Percent change
Shallow oil ²	45,478	48,645	— 7
Deep oil ³	443	578	— 23
TOTAL OIL	45,921	49,223	— 7

¹In 1,000 barrels.

²Shallow oil: from Late Devonian or younger rocks, generally less than 2,000 feet deep.

³Deep oil: from Lower Silurian Medina Group.

flooding began soon after. It was not until the early 1900's, however, that noticeable production enhancement became apparent. Since that time, most

of the Bradford field has been under waterflood. Figure 4 shows the changes in oil production in Pennsylvania since Drake's well was drilled in 1859, and the changes in oil production in the Bradford field. It should be noted that in 1987 the Bradford field produced only 13 percent of the total state production.

There are presently no tertiary oil recovery projects in operation in Pennsylvania.

NATURAL GAS PRODUCTION

Pennsylvania's natural gas production increased in 1987 by 2 percent, from the 1986 total of 159,889 million cubic feet (Mmcf) to 163,318 Mmcf. The number of producing gas wells increased 1 percent to an estimated 28,000. Figure 5 shows 1987 gas production statistics for Pennsylvania. Included is

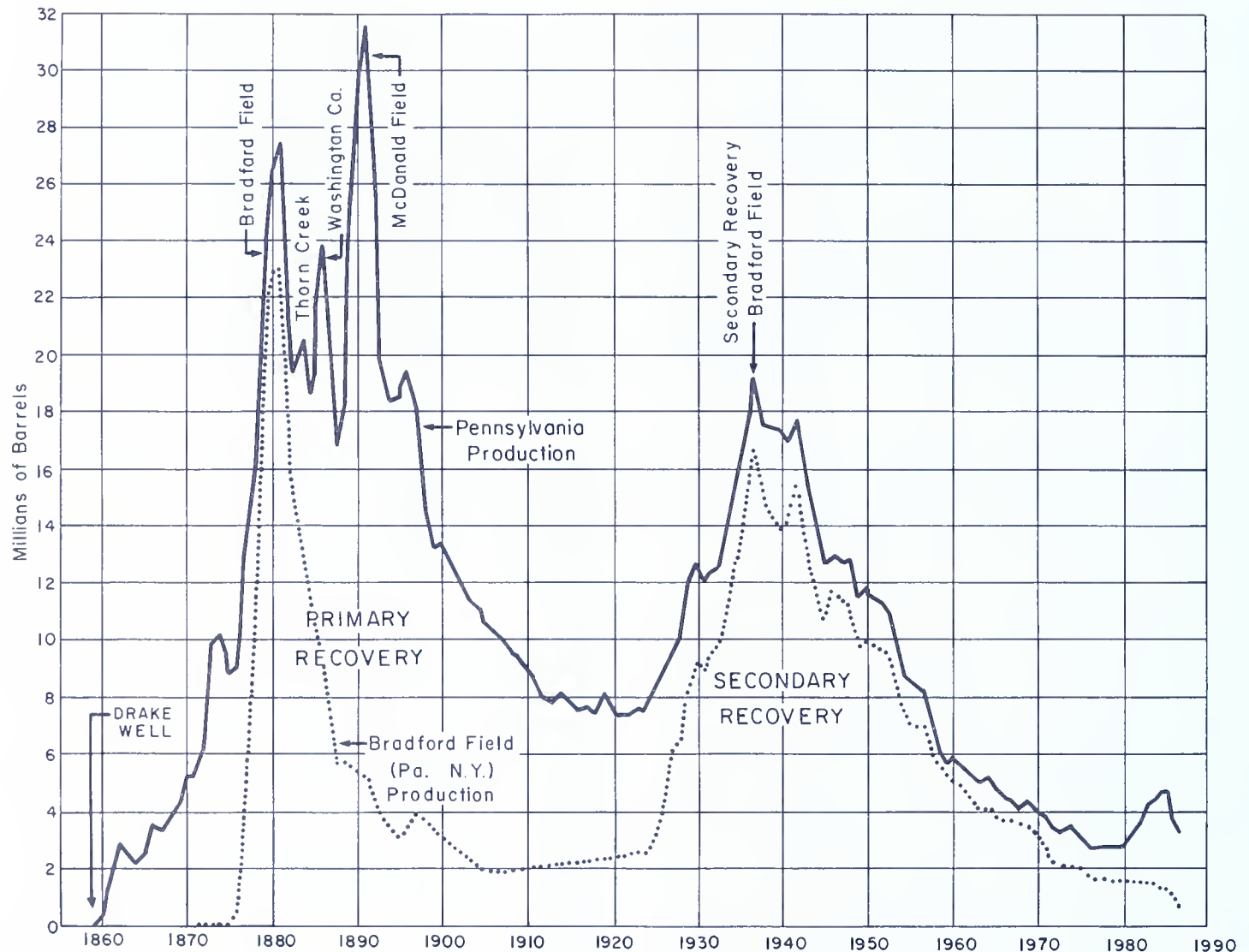


Figure 4. Annual production of crude oil in Pennsylvania, 1859-1987.

Figure 5. Natural gas production in Pennsylvania, 1987.

	¹ 1987	¹ 1986	Percent change	Cumulative to 12/31/87 ¹
Shallow gas ²	122,944	124,070	- 1	—
Deep gas ³	40,374	35,819	+ 13	—
TOTAL GAS	163,318	159,889	+ 2	10,393,388

¹In millions of cubic feet.

²Shallow gas: from Late Devonian or younger rocks; generally less than 4,000 feet deep.

³Deep gas: from Middle Devonian or older rocks; generally more than 4,000 feet deep.

a general breakdown of gas production by shallow and deep reservoirs.

NATURAL GAS RESERVES

Proven recoverable reserves of natural gas in Pennsylvania decreased 2 percent to 2,012,673

Mmcf in 1987. Figure 6 shows natural gas reserve figures for Pennsylvania in 1987, and Figure 7 graphically illustrates the differences among production, consumption, and reserves of natural gas since 1946.

NATURAL GAS STORAGE AREAS

Because Pennsylvania has traditionally consumed more natural gas than it has been able to produce, the natural gas industry stores gas in large quantities in the summer months to at least partially ensure an adequate supply during the winter. Storage reservoirs are typically old depleted gas-producing reservoirs, or bodies of rock whose geological and engineering characteristics would have made them ideal reservoirs had natural gas been emplaced in them. In Pennsylvania all of the major gas-producing horizons have been used at one time or another as storage reservoirs, but the most common reservoirs are Upper Devonian Bradford and Venango Group sandstones and fractured reservoirs

Figure 6. Natural gas reserves in Pennsylvania, 1987.

	¹ 1987	¹ 1986	Percent change
Total gas	2,012,673	² 2,053,536	- 2
Stored recoverable gas	585,543	585,812	- 1/2

¹In millions of cubic feet.

²Correction.

in the Ridgeley Sandstone. In Figure 8 the locations are shown and the names listed for all active gas storage areas in Pennsylvania in 1987. No changes were made in the status of any of Pennsylvania's storage areas in 1987. There were 6 wells reported in 1987 for gas storage. Recoverable gas in storage totaled 585,543 Mmcf in 1987 as compared with 585,812 Mmcf in 1986. This represents a very slight decrease (less than 1/2 percent) over last year.

OIL AND GAS PRICES

The price for crude oil in Pennsylvania increased slightly during the first half of 1987. The price, however, eventually decreased during the second half and completed the year where it began. Penn Grade crude oil sold for \$16.00 per barrel on January 1, 1987, and rose to a high of \$19.00 on July 15. The price then declined to \$16.00 on December 21. Changes in crude oil pricing in 1987 are shown in Figure 9.

Natural gas prices have been subject to controls under the Natural Gas Policy Act (NGPA) since 1978. The pricing structure of the NGPA raised natural gas prices gradually since then in order to provide operators with more realistic product prices. The lowest prices paid by utilities in Pennsylvania were for old gas, subject to old contracts, produced from pre-NGPA wells. Prices as low as \$0.25 per thousand cubic feet (Mcf) are common for gas bought under old contracts in some of the older producing areas of the Commonwealth. Some NGPA-pricing categories were deregulated on January 1, 1986. However, the highest price allowed for NGPA-regulated gas was \$6.50 per Mcf for Section 107 (High-Cost Gas, in this case the price allowed for gas from "tight formations" such as the Lower Silurian Medina Group and certain Upper Devonian sandstones). Because of the nationwide gas "glut," however, the highest price paid was \$5.05 per Mcf. The average price for gas was approxi-

mately \$2.25 per Mcf. Figure 10 shows NGPA price ceilings for natural gas during 1987.

DRILLING AND COMPLETION COSTS

The costs of drilling and completing a well, given below in dollars per foot, vary with the company, drilling depth, method of completion, and geographic area. Costs generally increase yearly due to inflation, but they may decline if the prices for fossil fuels (needed in manufacturing and transporting casing, cement, etc.) decline. Prices typically increase as total depth increases, especially for wells that penetrate deeper, undrilled or untested formations. Dry holes are generally less expensive than producing wells because not as much is done to the hole except drilling and, perhaps, logging. Extremely deep wells may be extraordinarily expensive, not just because of increased rig time and increased casing, cementing, and other needs, but because provisions must be made for potential unforeseen problems. Wells drilled in untested formations and/or unexplored areas may require special testing and completion techniques as well. In Pennsylvania an average well would be drilled about 2,749 feet deep (the average total depth for all wells reported in 1987), probably to the Upper Devonian Venango or Bradford Group. As such, a deep well (Lower Devonian Ridgeley Sandstone or Lower Silurian Medina Group) is generally greater than 5,000 feet deep, and anything deeper than 10,000 feet is considered ultra deep.

Because drilling conditions and company policies vary widely, even within a small geographic area, the drilling costs listed below are only estimates and should not be used as anything more than "ball-park" figures for the industry in 1987.

1. Venango County, shallow oil well in the Venango Group sandstones, about 800 feet deep. Dry hole,* about \$28 per foot. Completion, about \$31 per foot.
2. McKean-Elk County area, shallow oil well in the Bradford Group sandstones, about 2,400 feet deep. Dry hole,* about \$10 per foot. Completion, about \$15 per foot.
3. Indiana-Cambria-Clearfield County area, shallow gas well in the Bradford Group sandstones, about 3,500 feet deep. Dry hole,* about \$20 per foot. Completion, about \$35 per foot.
4. Fayette-Westmoreland County area, shallow gas well in the Bradford Group sandstones, about 4,000 feet deep. Dry hole,* about \$24 per foot. Completion, about \$44 per foot.

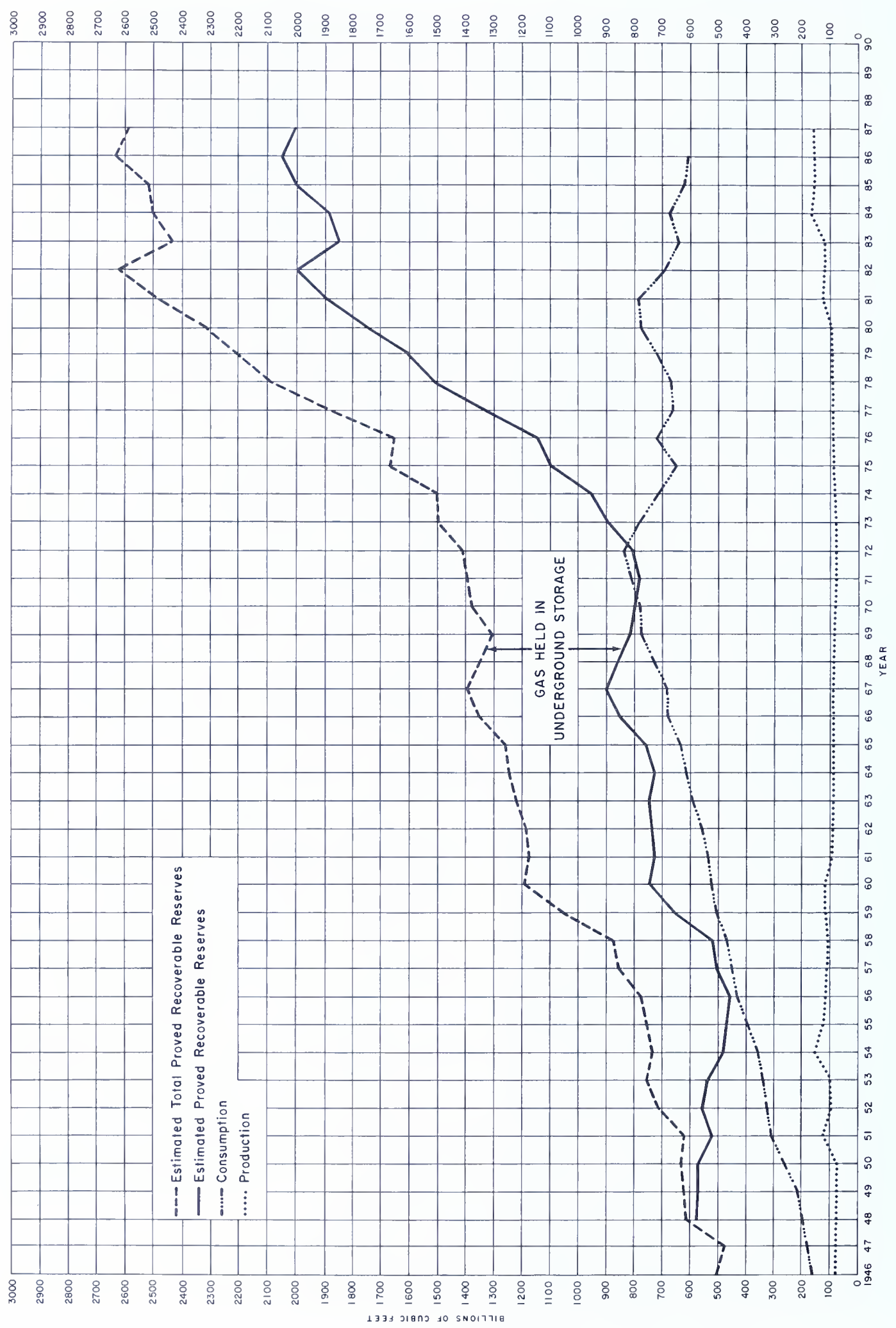


Figure 7. Production, consumption, and reserves of natural gas in Pennsylvania.

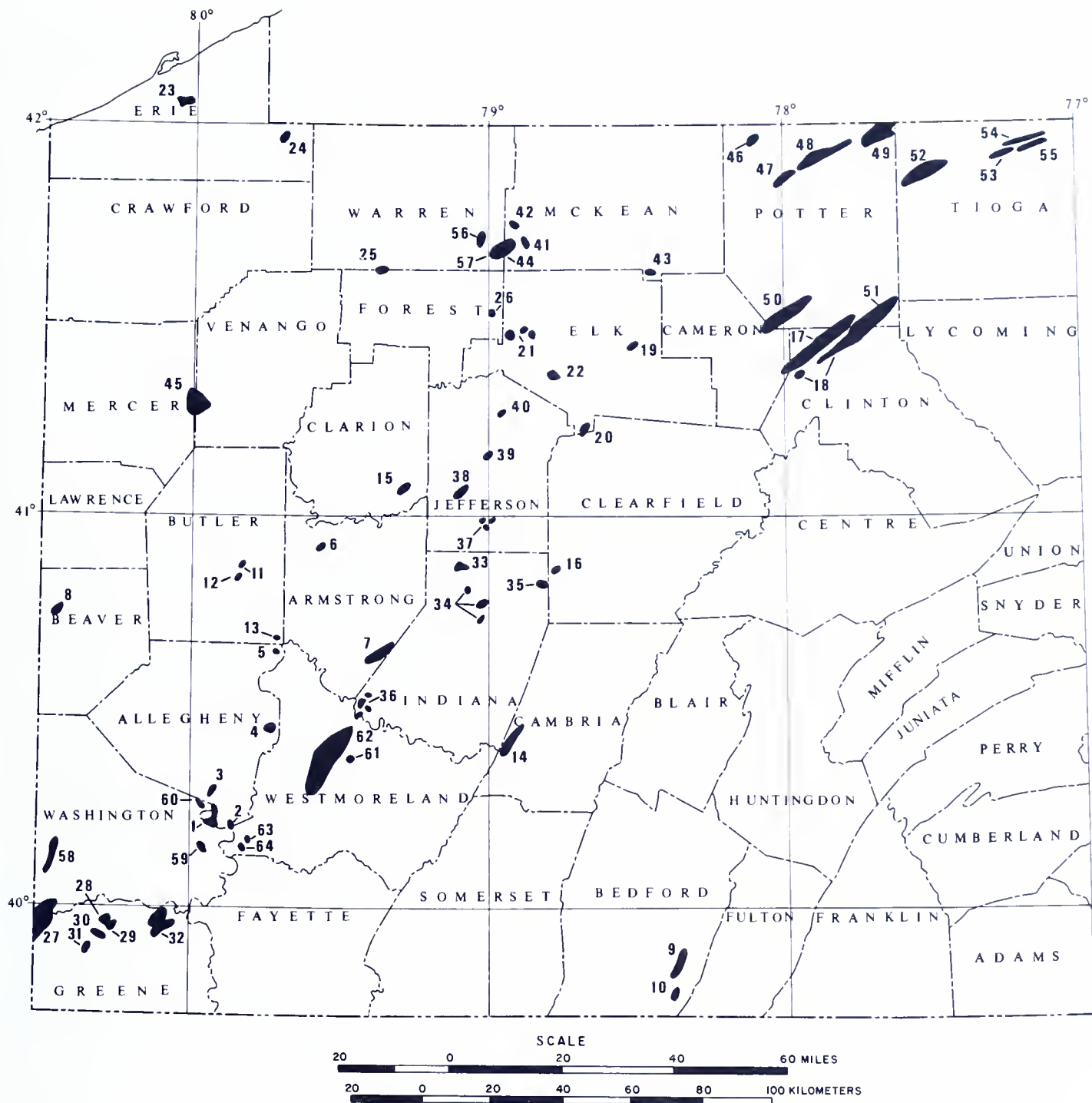


Figure 8. Active natural gas storage areas of Pennsylvania.

NAMES OF ACTIVE GAS STORAGE AREAS IN PENNSYLVANIA

ALLEGHENY COUNTY	BEAVER COUNTY	CAMBRIA COUNTY	ELK COUNTY
1. Bunala	8. Black Hawk	14. Rager Mountain	19. St. Marys
2. Gamble-Hayden		CLARION COUNTY	20. Baane Mauntain
3. Tepe	BEDFORD COUNTY	15. Truittsburg	21. Owls Nest
4. Murrys ville (Dice)	9. Artemas A	CLEARFIELD COUNTY	22. Belmauth
5. Smith-Parke	10. Artemas B	16. Gaurley-Miller	
	BUTLER COUNTY	CLINTON COUNTY	ERIE COUNTY
ARMSTRONG COUNTY	11. Vardy	17. Leidy	23. Summit
6. Fair and Helm	12. Partman	18. Tamarack	24. Carry
7. South Bend	13. Hughes		

NAMES OF ACTIVE GAS STORAGE AREAS IN PENNSYLVANIA (Continued)

FOREST COUNTY	JEFFERSON COUNTY	POTTER COUNTY (Continued)	WASHINGTON COUNTY
25. Queen	37. Sprinkle	48. Ellisburg	58. Donegal
26. Duhring	38. Galbraith	49. Harrison	59. Colvin
GREENE COUNTY	39. Markle	50. Wharton	60. Finleyville
27. Majorsville-Heard	40. Munderf	51. Greenlick	WESTMORELAND COUNTY
28. Swarts West	McKEAN COUNTY		61. Seanor
29. Swarts	41. Keelor	TIOGA COUNTY	62. Oakford
30. Hunters Cave	42. Swede Hill	52. Sabinsville	63. Webster
31. Holbrook	43. Wellendorf	53. Palmer	64. Patton
32. Pratt	44. East Branch "B"	54. Tioga	
INDIANA COUNTY	MERCER COUNTY	55. Meeker	
33. Alabran	45. Henderson	WARREN COUNTY	
34. Kinter	POTTER COUNTY	56. Deerlick	
35. Clark	46. Sharon	57. East Branch "A"	
36. Schmidt	47. Hebron		

Figure 9. Crude oil prices in Pennsylvania, 1987.

Date	Price per barrel
January 1, 1987.....	\$16.00
May 6, 1987.....	17.00
May 22, 1987.....	17.50
June 18, 1987.....	18.00
July 10, 1987.....	18.50
July 15, 1987.....	19.00
August 1, 1987.....	18.50
August 26, 1987.....	18.00
December 21, 1987.....	16.00

5. Centre-Clinton County area, shallow gas well in the Lock Haven Formation, about 4,500 feet deep. Dry hole,* about \$17 per foot. Completion, about \$29 per foot.
6. Crawford-Venango-Warren County area, deep gas well in the Medina Group sandstones, about 5,000 feet deep. Dry hole,* about \$20 per foot. Completion, about \$42 per foot.
7. Westmoreland-Fayette-Somerset County area, deep gas well in the Ridgeley Sandstone, about 7,800 feet deep. Dry hole,* about \$42 per foot. Completion, about \$62 per foot.

*No completion attempted.

1987 DRILLING AND COMPLETIONS

TOTAL COMPLETIONS

Pennsylvania's oil and gas industry reported a total of 2,085 wells drilled in the Commonwealth

in 1987. This was a 29 percent decrease in activity from the 1986 total of 2,951 wells, and represents the smallest number of new wells reported since 1980. The total includes 2,072 new wells and 13 old wells drilled deeper. Of these 2,085 wells reported in 1987, however, only 638 (31 percent) were actually drilled in 1987. Pennsylvania's oil and gas industry submitted records on wells drilled and completed as far back as 1974. The majority (59 percent) of the wells reported in 1987 were completed in 1984, 1985, and 1986. Figure 11 shows the breakdown of wells received by the years in which they were completed.

The total footage drilled in all reported wells decreased 31 percent, from 8,281,872 feet in 1986 to 5,709,665 feet in 1987. The average total depth in all wells drilled was 2,749 feet, a slight decrease from last year's average of 2,807. The eight most active counties for drilling in 1987 were Warren, Elk, Indiana, Venango, Armstrong, Clearfield, Crawford, and Erie in that order. Wells in these eight counties accounted for 80 percent of all wells reported in the Commonwealth during the year (see Figure 12).

OIL COMPLETIONS

The oil industry in Pennsylvania reported 944 oil well completions during 1987, including 1 old well drilled deeper. This number represents a 12 percent decrease over the 1986 total of 1,077 wells. Total footage drilled in all oil wells was 1,163,136 feet, a 14 percent decrease over a year ago. The average total depth for all new oil wells was 1,233 feet, a small decrease. The most active area for oil well drilling was Warren County, which accounted for

Figure 10. Natural gas price ceilings under federal Natural Gas Policy Act in 1987.

NGPA Section	Category of gas	Maximum lawful price for deliveries made in:											
		Jan. 1987	Feb. 1987	Mar. 1987	Apr. 1987	May 1987	June 1987	July 1987	Aug. 1987	Sept. 1987	Oct. 1987	Nov. 1987	Dec. 1987
cost per million British Thermal Units (dollars)													
102	New, Natural Gas Certain OCS Gas	Deregulated January 1, 1985											
103(a)	New, Onshore Production Wells ¹	Deregulated January 1, 1985											
103(b)(1)	New, Onshore Production Wells	3.161	3.164	3.167	3.170	3.180	3.190	3.200	3.210	3.220	3.231	3.238	3.245
107(c)	Gas Produced from Tight Formations	6.322	6.328	6.334	6.340	6.360	6.380	6.400	6.420	6.440	6.462	6.476	6.490
108	Stripper Gas	4.776	4.796	4.816	4.836	4.866	4.896	4.926	4.958	4.990	5.022	5.049	5.076
109	Not Otherwise Covered	2.617	2.620	2.623	2.626	2.634	2.642	2.650	2.659	2.668	2.677	2.683	2.689

¹Wells deeper than 5,000 feet.

Figure 11. *Number of well records received in 1987 by completion date.*

<i>Completion date</i>	<i>No. of wells</i>
1974	1
1975	0
1976	3
1977	4
1978	2
1979	8
1980	14
1981	25
1982	68
1983	85
1984	246
1985	212
1986	779
1987	638
TOTAL	2,085

77 percent of all oil wells reported in the Commonwealth in 1987 (Figure 13).

GAS COMPLETIONS

Pennsylvania's natural gas industry reported 996 gas well completions in 1987, including 11 old wells drilled deeper, a 38 percent decrease over the 1986 figure of 1,603 wells. The total footage drilled in all gas wells was 4,091,704 feet, a 34 percent decrease from 1986. The average depth for all new gas wells was 4,139 feet. The most active counties for gas well drilling were Indiana, Armstrong, Clearfield, Crawford, and Erie, accounting for 57 percent of all gas wells reported during the year. These data are summarized in Figure 14.

COMBINATION OIL AND GAS WELL COMPLETIONS (Not Reported Separately as Oil or Gas)

The Pennsylvania Geological Survey classifies a combination oil and gas well as any well that produces oil as a primary energy-mineral commodity, but that also produces at least 50 Mcfgpd (thousand cubic feet of gas per day). Most oil wells drilled in Pennsylvania produce a little gas, and many produce enough gas to be sold to utilities or pipeline companies. However, if the well produces less than 50 Mcfgpd, regardless of whether or not the gas is sold, it is classified only as an oil well.

Figure 12. *New well completions and old wells drilled deeper in Pennsylvania, 1987.*

NEW WELL COMPLETIONS

<i>County</i>	<i>No. of wells</i>	<i>Average total depth (feet)</i>
Armstrong	123	3,509
Beaver	11	1,921
Bradford	1	6,118
Butler	12	1,794
Cambria	10	3,563
Centre	58	4,855
Clarion	20	2,265
Clearfield	116	4,043
Clinton	21	4,767
Crawford	108	4,929
Elk	145	2,463
Erie	95	3,689
Fayette	7	3,340
Forest	34	1,541
Indiana	140	3,732
Jefferson	28	3,437
McKean	60	1,895
Mercer	32	5,045
Potter	21	2,701
Somerset	7	8,250
Tioga	2	4,722
Venango	125	3,655
Warren	806	1,447
Washington	3	2,502
Westmoreland	87	3,667
TOTAL	2,072	2,749

OLD WELLS DRILLED DEEPER

<i>County</i>	<i>No. of wells</i>	<i>Average amount deepened (feet)</i>
Allegheny	1	39
Armstrong	3	1,957
Elk	1	242
Erie	2	1,238
Greene	1	30
Jefferson	1	2,053
Warren	1	298
Westmoreland	3	1,299
TOTAL	13	1,146

Pennsylvania's oil and gas operators reported only 9 new combination wells in 1987, an 85 percent decrease over the 1986 total of 58 new wells. Total footage for these 9 wells was 15,655 feet, an 89 percent decrease from a year ago. The average depth for the wells was 1,739 feet. These data are summarized in Figure 15.

Figure 13. New oil well completions and old oil well drilled deeper in Pennsylvania, 1987.

NEW OIL WELL COMPLETIONS			
County	No. of wells	Average initial production (bopd) ¹	Average total depth (feet)
Beaver	9	1	1,628
Bradford	1	0	6,118
Butler	8	4	1,411
Clarion	2	17	1,270
Elk	55	1	2,481
Erie	1	0	2,720
Forest	30	3	1,546
McKean	45	1	1,808
Potter	10	0	1,554
Venango	49	8	855
Warren	730	14	1,095
Westmoreland	1	2	3,242
TOTAL	943	12	1,233
OLD OIL WELL DRILLED DEEPER			
County	No. of wells	Average initial production (bopd) ¹	Average amount deepened (feet)
Warren	1	10	298

¹bopd, barrels of oil per day.

DRY COMPLETIONS

A total of 64 new dry holes was reported in Pennsylvania in 1987. These wells represent a 58 percent decrease in the number of dry holes from 1986, when 151 dry holes were reported. The success rate for all drilling was 97 percent. The total footage for dry holes in Pennsylvania in 1987 was 255,575 feet, a 43 percent decrease. The average total depth for all dry holes was 3,993 feet (Figure 16).

MISCELLANEOUS WELLS

Miscellaneous wells include all wells that cannot specifically be considered oil- and gas-producing wells or dry holes. They include service wells, gas storage wells, and junked and abandoned wells. Service wells comprise several types: stratigraphic core tests, drilled to collect subsurface information such as formation thickness or the effects of well completion on various rock types; water-supply wells for waterflood projects; fluid-injection wells for secondary and tertiary recovery of oil; liquid-waste

Figure 14. New gas well completions and old gas wells drilled deeper in Pennsylvania, 1987.

NEW GAS WELL COMPLETIONS			
County	No. of wells	Average initial open flow (Mcfgpd) ¹	Average total depth (feet)
Armstrong	120	562	3,523
Butler	3	66	2,878
Cambria	7	597	3,471
Centre	51	1,055	4,849
Clarion	17	57	2,445
Clearfield	109	540	3,979
Clinton	13	749	4,674
Crawford	107	1,398	4,928
Elk	31	257	2,462
Erie	90	1,317	3,737
Fayette	7	1,014	3,340
Forest	4	32	1,505
Indiana	137	762	3,756
Jefferson	28	460	3,437
McKean	9	108	2,148
Mercer	29	1,091	5,266
Potter	3	102	2,715
Somerset	4	2,080	8,492
Venango	71	582	5,515
Warren	67	1,115	5,302
Westmoreland	78	996	3,808
TOTAL	985	843	4,139

OLD GAS WELLS DRILLED DEEPER			
County	No. of wells	Average initial open flow (Mcfgpd) ¹	Average amount deepened (feet)
Allegheny	1	48	39
Armstrong	3	710	1,957
Elk	1	25	242
Erie	2	1,100	1,238
Jefferson	1	193	2,053
Westmoreland	3	857	1,299
TOTAL	11	651	1,325

¹Mcfgpd, thousand cubic feet of gas per day.

disposal wells; and gas-storage observation wells. Increases and decreases within this category do not accurately reflect oil and gas drilling trends because, for instance, an oil field operator may drill all of his water-supply wells and fluid-injection wells several years after the oil-producing wells have been completed.

In 1987 industry reported 72 miscellaneous wells in Pennsylvania, including 1 old well drilled deeper. Of these, 64 were classified as service wells. This

Figure 15. *New combination oil and gas well completions in Pennsylvania, 1987.*

County	No. of wells	Average initial production (bopd) ¹	Average initial open flow (Mcfgpd) ²	Average total depth (feet)
Erie	2	³	3,677	3,110
Potter	3	³	50	1,348
Warren	3	1	108	750
Westmoreland	1	4	130	3,141
TOTAL	9	1	884	1,739

¹bopd, barrels of oil per day.²Mcfgpd, thousand cubic feet of gas per day.³Initial production not reported.Figure 16. *New dry hole completions in Pennsylvania, 1987.*

County	No. of dry holes	Average total depth (feet)
Armstrong	3	2,959
Beaver	2	3,238
Butler	1	1,600
Cambria	3	3,779
Centre	7	4,897
Clarion	1	1,189
Clearfield	7	5,037
Clinton	8	4,919
Crawford	1	4,986
Elk	4	2,121
Erie	2	2,563
Indiana	2	3,795
McKean	2	2,274
Mercer	1	7,006
Potter	2	4,101
Somerset	3	7,928
Venango	5	4,686
Warren	3	2,548
Washington	1	2,488
Westmoreland	6	2,321
TOTAL	64	3,993

is a 14 percent increase from the 1986 total of 56 wells. Fifty-three of the service wells reported during the year were injection wells for secondary oil recovery projects, but 11 core tests were also reported. The total footage drilled in these 64 service wells was 151,315 feet, a 36 percent increase from the footage drilled in 1986. The average total depth for all service wells was 2,364 feet. The average total depth for all miscellaneous wells was 2,585 feet (Figure 17).

Figure 17. *New miscellaneous well completions and old miscellaneous well drilled deeper in Pennsylvania, 1987.*NEW MISCELLANEOUS WELL COMPLETIONS¹

County	No. of wells	Average total depth (feet)
Elk	55	2,470
Indiana	1	290
McKean	4	2,119
Potter	3	6,932
Tioga	2	4,722
Warren	3	660
Washington	2	2,509
Westmoreland	1	1,720
TOTAL	71	2,585

OLD MISCELLANEOUS WELL DRILLED DEEPER

County	No. of wells	Average amount deepened (feet)
Greene	1	30

¹Miscellaneous well completions include gas injection, water intake, stratigraphic core tests, gas storage wells, and junked holes.

DRILLING AND PRODUCTION ACTIVITY

(Classified as Shallow or Deep)

The Oil and Gas Geology Division of the Pennsylvania Geological Survey classifies oil and gas wells as shallow or deep depending on the stratigraphic level penetrated, rather than on actual depth. In general, wells that penetrate the top of the Tully Limestone or its equivalent (the presently accepted Upper-Middle Devonian boundary) are considered deep. Wells that do not penetrate the Tully horizon are generally considered shallow. The exceptions to this general rule involve formations of great significance, such as the rocks of the Mesozoic basins in southeastern Pennsylvania. Because the Appalachian basin is wedge shaped, absolute drilling depth is not instrumental in this classification. As such, a Lower Silurian Medina Group well along the shore of Lake Erie in Erie County may be only 2,500 feet deep, whereas an Upper Devonian Lock Haven Formation well in Centre County may be greater than 5,000 feet deep. Yet, the Medina well is considered deep and the Lock Haven

well is considered shallow on the basis of the stratigraphic interval penetrated.

Shallow wells account for the greatest number of wells drilled in Pennsylvania; they may produce oil, gas, or both. Deep wells are rarer than shallow wells because of increased cost and risk; they most commonly produce gas, but there are numerous wells in northwestern Pennsylvania that also produce oil. Very few deep wells produce oil as their main, or sole, energy-mineral commodity. Figure 18 illustrates shallow-well drilling activity in Pennsylvania since 1950, and Figure 19 shows the changes in deep-well drilling activity during the period 1930–87.

There were 1,694 shallow wells reported in Pennsylvania in 1987, a decrease of 30 percent from the 2,412 wells reported in 1986. This 1987 total includes 1,617 new oil, gas, combination, and dry wells, 10 old wells deepened, and 67 miscellaneous wells. In general, both the shallow oil wells and the shallow gas wells were drilled to Bradford Group reservoirs, but a substantial number of each produced from Venango Group reservoirs. Subsidiary drilling in other shallow horizons found production in the (1) Lower Mississippian “Murrysville” sand; and (2) Upper Devonian Elk Group and Lock Haven Formations. Shallow oil- and/or gas-well drilling in Warren, Elk, Indiana, Venango, Armstrong, and Clearfield Counties accounted for 80 percent of all shallow drilling reported in 1987.

Reported deep drilling in Pennsylvania also decreased markedly in 1987. During the year 391 deep wells were reported, a decrease of 28 percent over the 1986 figure of 539 deep wells. Drilling to the Lower Silurian Medina Group in Crawford, Erie, Venango, Warren, and Mercer Counties dominated deep drilling, accounting for 93 percent of all deep-well activity. Other deep formations drilled during 1987 for natural gas (and oil) production include the (1) Middle Devonian Onondaga Formation and Huntersville Chert; (2) Lower Devonian Bois Blanc and Oriskany Formations, and Ridgeley Sandstone; and (3) Upper Silurian Bass Islands Dolomite and Salina Group.

Figure 20 shows the statistical breakdown for both shallow and deep wells reported in Pennsylvania in 1987. Figure 21 illustrates shallow- and deep-well drilling in terms of the final reported producing formations.

Shallow production totaled 122,944 Mmcf of gas and 3,167,183 bbl of oil, whereas deep production accounted for 40,374 Mmcf of gas and 134,580 bbl of oil. Figure 22 shows deep gas production during the year by field and pool. In Figure 23, the infor-

mation in Figure 22 is summarized by showing amounts of gas produced from the various deep reservoirs, both as an annual total and as cumulative totals. Figure 24 illustrates the amount of production, the yearly average unit price, and yearly total values for oil and gas produced in Pennsylvania since 1960.

PENNSYLVANIA DRILLING AND PRODUCTION RECORDS

The drilling depth record for Pennsylvania was set at 21,460 feet by the Amoco Production Company #1 Svetz well in Somerset County in 1974. The well penetrated the top of the Middle Cambrian. This is also the deepest well drilled in the Appalachian basin. The deepest producing depth in Pennsylvania is 13,168 feet in the Texaco U.S.A. #1 Commonwealth of Pennsylvania Tract 289 well, which was completed in Lycoming County in 1985. Production in this well is from the Upper Ordovician Bald Eagle Formation. The record for largest initial production of gas for both Pennsylvania and the Appalachian basin is held by the New York State Natural Gas #1 Finnefrock well in Leidy field, Clinton County. The well flowed 145,000 Mcfgpd without stimulation from the Lower Devonian Ridgeley Sandstone at 6,339 feet when drilled in 1951. The largest initial production for oil in Pennsylvania is, once again, a basin record. The Jennings Brothers #1 Mathews well in the McDonald-McCurdy field, Allegheny County, reportedly flowed between 12,000 and 21,000 bopd (barrels of oil per day) from the Upper Devonian Venango Group (“Fifth sand”) in 1891.

OIL AND GAS EXPLORATORY AND DEVELOPMENT ACTIVITIES

The Pennsylvania Geological Survey, Oil and Gas Geology Division, uses a classification scheme for exploratory and development drilling that is modified from the definitions used by the Committee on Statistics of Drilling of the American Petroleum Institute/American Association of Petroleum Geologists. All wells reported here are the same as those reported under drilling and completions in the previous section of this report. In Figure 25, drilling activity in Pennsylvania in 1987 is summarized as exploratory, development, or service.

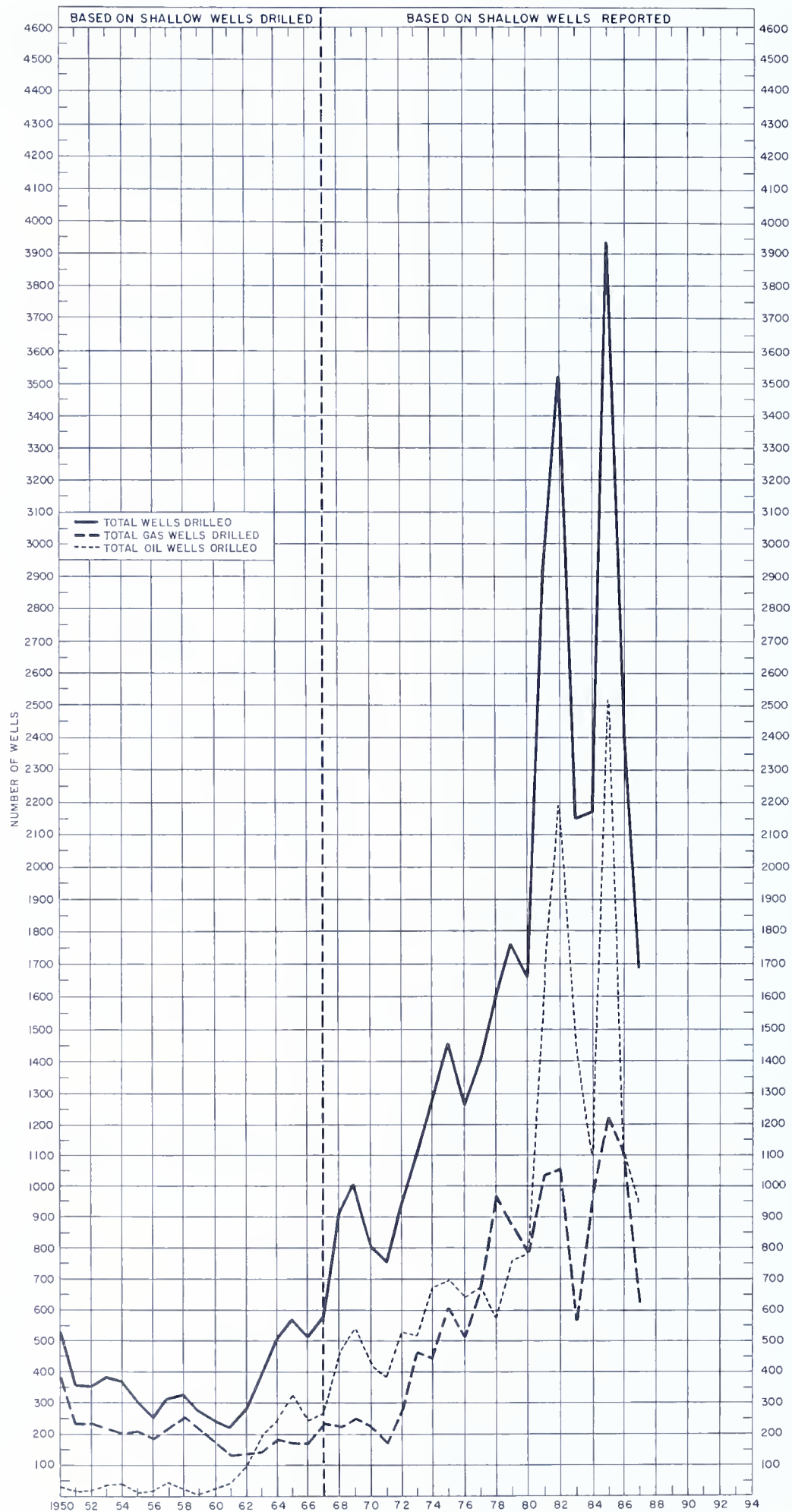


Figure 18. Shallow-well activity, 1950-87 (Late Devonian or younger producing horizons; generally less than 4,000 feet deep).

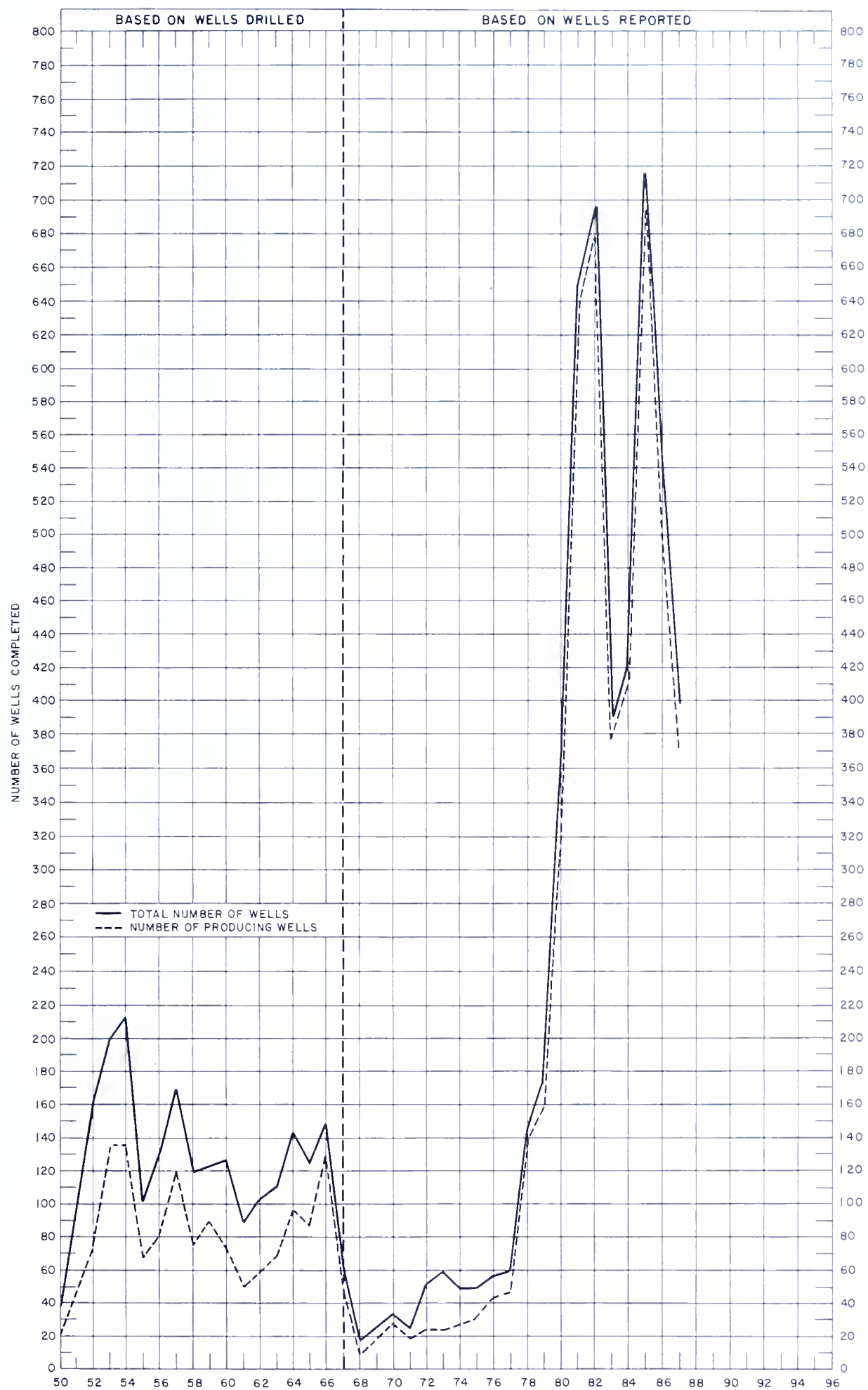


Figure 19. Annual rate of deep formation exploration and development, 1950-87 (Middle Devonian or older producing horizons; generally more than 4,000 feet deep).

Figure 20. *Drilling and completion of wells reported, 1987 (according to geologic age and depth of producing horizons).*

<i>Shallow—Upper Devonian and younger</i>	
NEW WELLS	
Gas	621
Oil	941
Oil and gas	7
Dry	48
Total	1,617
DEEPENED WELLS	
Gas	9
Oil	1
Total	10
MISCELLANEOUS WELLS	
Water injection	53
Stratigraphic core tests	11
Gas storage	1
Junked holes ¹	2
Total	67
Total shallow wells	1,694
<i>Deep—Middle Devonian and older</i>	
NEW WELLS	
Gas	364
Oil	2
Oil and gas	2
Dry	16
Total	384
DEEPENED WELLS	
Gas	2
MISCELLANEOUS WELLS	
Gas storage	5
Total deep wells	391
TOTAL ALL WELLS DRILLED	2,085

¹Includes 1 deepened junked hole.

DEVELOPMENT WELLS

A development well is one that is drilled within a proven area of production to a known productive stratigraphic horizon. A producing well in such an area and reservoir is classified as an oil or gas development well. It is considered a dry development well if it is not completed for production.

Development drilling in Pennsylvania during the year decreased by 28 percent, from 2,786 wells in 1986 to 1,937 wells in 1987. The success rate for all development drilling remained high at 98 percent. It should be pointed out that "success" means simply that the well was completed for production with-

out specific reference to long-term economic viability.

EXPLORATORY WELLS

An exploratory well is one that is drilled to (1) find and produce oil or gas in unproven areas; (2) find a new reservoir in an area previously known to have oil and/or gas production in another reservoir; or (3) extend the known limit of a productive oil or gas reservoir. New field wildcats, new pool wildcats, deeper pool tests, shallower pool tests, and outpost/extension tests make up the exploratory categories. If the well is drilled as an exploratory test and is not completed for production, it is classified as a dry exploratory hole.

Exploratory drilling in Pennsylvania decreased during the year by 26 percent, from 103 wells reported in 1986 to 76 wells reported in 1987. Measured as a percentage of total reported wells, however, exploratory drilling increased from 3 percent in 1986 to almost 4 percent in 1987. The success rate for all exploratory wells was 74 percent. This is an increase from the previous year, when only 60 percent of all exploratory wells were successfully completed. Figure 26 shows the breakdown of exploratory drilling by classification. All exploratory successes and the more important exploratory failures of 1987 are illustrated in Figure 27, and these wells are listed in Figures 28 and 29.

HIGHLIGHTS OF 1987 EXPLORATION AND DEVELOPMENT

As in previous years, shallow drilling dominated oil and gas activity in Pennsylvania in 1987. Shallow targets in Pennsylvania classically include a few Mississippian sandstone reservoirs supporting the more numerous and more prolific Upper Devonian sandstone reservoirs of the Venango, Bradford, and Elk Groups and the Lock Haven Formation. In addition, several deeper or more "exotic" reservoirs, such as the Brallier and Catskill Formations, have recently acted as subsidiary reservoirs. Figure 30 illustrates the stratigraphic positions of the major Upper and Middle Devonian and Lower Mississippian reservoir formations in western and north-central Pennsylvania.

Historically, the Venango and Bradford Group rocks have been the primary oil and gas reservoirs in Pennsylvania. The Venango Group reservoirs are most productive in the western half of Pennsylvania's shallow oil and gas belt, but they also provide important production in most of the gas fields

Figure 21. Oil and gas well completions in Pennsylvania by shallow and deep producing formations, 1987.

<i>Producing formation</i>		<i>Oil wells</i>	<i>Gas wells</i>	<i>Combination oil and gas wells</i>	<i>Gas storage wells</i>	<i>Total wells</i>
S H A L L O W	Mississippian	0	3	0	1	4
	Mississippian/Venango/Bradford	0	5	0	0	5
	Venango	238	9	3	0	250
	Venango/Bradford	1	161	1	0	163
	Venango/Bradford/Elk	0	5	0	0	5
	Bradford	703	323	3	0	1,029
	Bradford/Elk	0	34	0	0	34
	Bradford/Brallier	0	2	0	0	2
	Elk	0	19	0	0	19
	Catskill/Lock Haven	0	3	0	0	3
	Lock Haven	¹ 1	63	0	0	64
	Ohio Shale	0	3	0	0	3
	Subtotal	943	630	7	1	1,581
D E E P	Marcellus/Onondaga	0	1	0	0	1
	Onondaga Limestone	1	6	1	0	8
	Huntersville	0	2	0	0	2
	Huntersville/Ridgeley	0	4	0	0	4
	Bois Blanc/Medina	0	1	0	0	1
	Oriskany	0	3	0	0	3
	Ridgeley	0	2	0	5	7
	Salina	0	1	0	0	1
	Medina	0	346	1	0	347
	Subtotal	1	366	2	5	374
	GRAND TOTAL	944	996	7	6	1,955

¹One deep well producing shallow.

east of the Monongahela and Allegheny Rivers, particularly as commingled or subsidiary reservoirs to Bradford Group rocks. The reservoir rocks of the Venango Group provided primary production of oil and/or gas in 250 wells in Pennsylvania in 1987, and commingled production in 173 others. The Bradford Group is typically the most actively drilled and produced sequence of rocks in the Commonwealth. Fully 1,029 wells produced oil and/or gas solely from the Bradford Group, and 209 others produced primarily or secondarily from Bradford Group reservoirs. Only two small new pools were discovered in the Bradford Group in 1987. Challenge pool in the Boone Mountain field of Elk County was discovered through the drilling of the Empire Exploration #1 NW Mining well in Fox Township. The well had an after-treatment open flow of 55 Mcfgpd at 2,135 feet. Pine Hill Run pool, a deeper gas pool in the Foster-Reno oil field of Venango County, was discovered through the drilling of the Myers Gas Company #8 Conrail Railroad well at 1,578 feet.

The Foster-Reno field produces oil from the Venango Group.

The Elk Group consists of a few thick to thin beds of sandstone scattered throughout a thick interval of shales and siltstones. Prior to the drilling "boom" of the early 1980's, Elk production was almost restricted in Pennsylvania to the northern counties, specifically McKean and Elk Counties. Because of the operators' new confidence in drilling deeper in established fields in the central part of the oil and gas belt, however, the past several years have seen an upsurge in wells producing, at least partially, from Elk Group reservoirs. In 1987, industry reported 19 gas wells that produced exclusively from Elk Group sandstones, and an additional 39 that had commingled production from the Elk and at least one other formation.

The Upper Devonian Lock Haven Formation in Centre and Clinton Counties is rapidly becoming one of the more important reservoir formations in the Commonwealth. Council Run field, discovered

Figure 22. Gas production from rocks of Middle Devonian or older age in Pennsylvania, 1987 (classified as "deep" production).

County	Field	Pool	Discovery date	Production 1987 (Mcf) ¹	Cumulative production at end of 1987 (Mcf) ¹	Status of field or pool at end of 1987 ²	Reserve ³
Armstrong	Goheenville	Snyderville	10/23/70	⁴ 17,170	356,214	Prod.	O
	Roaring Run	Roaring Run	12/14/70	⁴ 61,900	7,728,662	Prod. and SI	O
		Oriskany					
Cambria	Carrolltown	Burley	1/13/69	⁴ 700	373,872	Prod. and SI	O
		Pindleton	6/30/69	⁴ 98,250	5,658,521	Prod. and SI	O
Cambria and Indiana	Strongstown	Lizowitz	6/19/54	⁴ 304,900	13,495,404	Prod. and SI	O
		Pineton	12/20/69	⁴ 203,700	14,164,083	Prod. and SI	O
Cameron and Elk	Hicks Run		6/ 7/56	7,404	4,390,042	Prod. and SI	O
	Whippoorwill		7/10/61	29,535	16,440,480	Prod. and SI	O
Cameron, Clearfield, Elk, Indiana, and Jefferson	Punxsutawney-Driftwood	TOTAL	9/15/51	279,807	384,999,677	Prod., SI, and aban.	O
		Benezette	1/ 5/53	⁴ 136,500	252,156,573	Prod., SI, and aban.	O
		Driftwood	9/15/51	24,099			
		Grove Hill	2/18/81	0	11,719	SI	O
		Helvetia	5/11/60	0	132,831,385	Prod.	O
		Rockton	2/25/55	115,553			
		Reed-Deemer	12/ 1/53	3,655			
Centre	Big Run		3/31/82	⁴ 150,000	304,647	Prod.	T
	Black Moshannon		12/18/77	42,194	2,747,712	Prod. and SI	T
	Devils Elbow		2/28/80	29,686	673,396	Prod.	T
	Runville		1/13/83	541,485	2,136,967	Prod.	O
Clearfield	Gifford Run						
Clearfield, Elk, and Jefferson	Penfield	DuBois	1/ 6/60	19,034	106,360,747	Prod. and SI	O
		Sabula	8/26/63	21,032	1,477,235	Prod. and SI	O
Clinton	Grugan		8/12/82	332,582	2,613,205	Prod.	BE
Crawford	Athens	TOTAL	9/20/74	2,107,806	11,557,333	Prod. and SI	M
		Brimstone	1/30/79	577,449	4,197,852	Prod. and SI	M
		Dutch Hill	8/31/80	359,264	1,908,754	Prod.	M
		Lincolnvill	8/16/80	50,543	413,689	Prod.	M
		Potash Run	3/18/79	39,084	396,544	Prod.	M
		Rome	6/ 9/79	879,309	2,902,455	Prod.	M
		Motter	3/ 7/86	22,741	34,770	Prod.	M
			8/ 5/81	⁴ 19,500	144,432	Prod.	M
Black Ash							
Blooming Valley							
Cambridge Springs							
			1/31/76	⁴ 515,600	1,817,634	Prod. and SI	M

Crawford and Erie.....	Conneaut Lake	Cambridge	4/ 6/76	⁴ 93,000	303,849	Prod. and SI	M
	Eaton Corners	Brown Hill	8/ 9/82	18,174	118,467	Prod. and SI	M
	Fauncetown	Crawther	11/15/81	⁴ 130,600	689,958	Prod.	M
	Frenchtown		9/16/86	39,969	53,490	Prod. and SI	M
	Geneva	Greenwood	8/17/80	32,892	75,547	Prod.	M
		Rock Creek	10/31/73	82,551	411,679	Prod.	M
	Papenfuse		6/27/77	87,431	741,347	Prod.	M
	Randolph		11/16/80	24,670	261,795	Prod. and SI	M
	Richmond	Delamater	9/11/81	⁴ 5,400	18,090	Prod. and SI	M
	Township	Woodcock	7/21/81	⁴ 10,500	59,656	Prod.	M
Crawford and Erie.....	Rockdale	Zirkle	6/22/81	⁴ 32,400	73,115	Prod. and SI	M
	Sparta		11/30/79	⁴ 1,206,800	4,247,062	Prod., SI, and aban.	M
	Conneaut	Eastman Hill	10/30/75	13,715	50,990	Prod., SI, and aban.	M
		<i>TOTAL</i>	2/11/57	3,088,365	68,602,876	<i>Prod., SI, and aban.</i>	<i>M</i>
		Beaver Creek	9/26/81	7,721	53,717	Prod.	M
		Blood	2/17/80	⁴ 320,100	1,302,142	Prod. and SI	M
		Bushnell-	12/31/58	⁴ 413,700	21,219,500	Prod., SI, and aban.	M
		Lexington					
		Carlson	2/23/81	309,049	1,690,219	Prod. and SI	M
		Forro	1/ 4/58	⁴ 4,400	47,214	Prod. and SI	M
Crawford and Mercer		Indian Springs	9/11/57	1,121,049	23,768,948	Prod., SI, and aban.	M
		Kastle	7/14/62	178,783	3,447,541	Prod. and SI	M
		Lundys Lane	11/ 9/61	382,193	7,839,210	Prod., SI, and aban.	M
		Marsh Run	5/20/82	2,660	9,403	Prod. and SI	H
		Mud Run	11/ 5/81	31,298	85,946	Prod. and SI	M
		Pageville	10/10/80	⁴ 53,000	723,707	Prod. and SI	M
		Pennside	9/ 9/59	63,293	307,601	Prod.	M
		Rogers	4/ 8/82	6,157	35,317	Prod. and SI	O
		Springboro	7/ 7/79	27,438	386,323	Prod. and SI	N
		Stone Run	10/21/79	156,624	919,802	Prod. and SI	N
Crawford and Mercer		West Mead	7/ 8/74	⁴ 10,900	81,937	Prod.	M
			6/17/81	⁴ 62,570	429,427	Prod. and SI	N
			1/18/79	7,436	79,598	Prod. and SI	N
		<i>TOTAL</i>	7/26/77	3,228,434	22,128,623	<i>Prod. and SI</i>	<i>M</i>
		Barco	12/13/80	4,346	38,743	Prod. and SI	N
		East Fairfield	7/31/80	145,282	1,181,982	Prod.	N
		Mt. Pleasant					
		Road	8/30/80	23,667	182,268	Prod.	N
		Round Knob	11/12/80	102,396	927,573	Prod.	N
		Shaw's Corners	7/15/80	219,104	1,746,116	Prod.	N
Sheakleyville			5/12/81	131,827	923,912	Prod.	N
		Osborn	9/ 6/81	⁴ 330,000	1,684,884	Prod. and SI	N

Figure 22. (Continued).

County	Field	Pool	Discovery date	Production 1987 (Mcf) ¹	Cumulative production at end of 1987 (Mcf) ¹	Status of field or pool at end of 1987 ²	Reser-voir ³
Crawford, Mercer, and Venango.....	Cochrannton	Deckard	11/16/80	736,678	5,709,492	Prod. and SI	M
		McDaniels	11/ 4/80	118,141	805,903	Prod. and SI	M
		Gresham	3/16/81	130,419	1,025,901	Prod.	M
		Wilson Mills	10/ 5/85	235,490	242,984	Prod. and SI	M
Crawford and Venango	Lake Creek Troy	Diamond	12/22/84	680,925	1,055,404	Prod. and SI	M
		Bates Hollow	6/21/86	49,727	49,727	Prod.	M
		Hatchtown	4/ 8/85	88,940	115,368	Prod.	M
		Vrooman	6/27/79	554,551	1,274,267	Prod.	M
Crawford and Warren.....	Church Run	Three Bridge	12/ 7/79	1,342,656	3,408,450	Prod.	M
		Porky Run	1/31/81	⁴ 192,360	960,721	Prod. and SI	M
		County Line	2/28/81	481,148	830,074	Prod. and SI	M
		Selkirk	11/ 5/86	223,331	223,331	Prod.	M
Erie.....	Dotyville Alder Run Carter Hill	Porky Run	8/24/74	⁴ 185,350	644,403	Prod. and SI	M
		Macedonia	5/14/79	128,986	688,153	Prod. and SI	M
		Harbor Ridge	4/20/84	79,707	362,259	Prod.	H
		Concord	10/ 2/79	33,481	⁴ 62,000	Prod. and SI	M
	Corry	Stewart Road	3/10/80	36,637	36,637	Prod. and SI	M
		TOTAL	4/29/47	⁴ 158,272	1,845,717	Prod., SI, aban., and gas stor.	M
		Beaver Dam	5/20/53	⁴ 13,000	365,521	Prod. and SI	M
		Spencer Creek	6/19/70	31,935	144,078	Prod., SI, and aban.	M
	Davy Hill Drumlin	Tarbell	9/12/80	⁴ 2,000	41,979	Prod.	M
		Pittsfield	9/17/85	⁴ 5,000	13,262	Prod.	M
		Greenley	10/11/83	⁴ 145,500	1,054,816	Prod. and SI	H
		Swails	6/27/80	⁴ 1,100,900	5,409,075	Prod. and SI	M
	Edinboro Edinboro North	Conneauttee	7/28/80	⁴ 184,000	1,431,413	Prod. and SI	M
		Bartosik	1/ 9/80	⁴ 903,000	5,995,437	Prod. and SI	M
		Blass	10/14/82	3,721	42,269	Prod.	S
		Car Wash	3/ 7/79	⁴ 60,850	337,450	Prod.	O
	Erie	Charter Oaks	2/12/66	⁴ 4,000	12,902	Prod.	M
		Dunn Valley	3/ 1/85	⁴ 15,000	67,214	Prod. and SI	O
		Glenwood	5/19/77	104,043	612,299	Prod. and SI	M
		Goddard	1/19/80	⁴ 15,400	76,836	Prod.	M
		Talcott	8/ 9/77	⁴ 13,200	200,759	Prod. and SI	M
			8/31/78	⁴ 151,600	738,838	Prod. and SI	M
			7/ 8/79	⁴ 200,260	1,897,149	Prod. and SI	M

[illegible]

Figure 22. (Continued).

County	Field	Pool	Discovery date	Production 1987 (Mcf) ¹	Cumulative production at end of 1987 (Mcf) ¹	Status of field or pool at end of 1987 ²	Reser-voir ³
Mercer	Big Bend	Delaware	9/ 1/83	17	2,577	Prod.	M
	Coolspring	Filer Corners	8/ 8/83	12,232	31,523	Prod. and SI	M
	Greenfield		5/17/84	739,881	1,159,639	Prod.	M
	Greenville	Thiel	10/28/81	21,359	80,336	Prod. and SI	M
	Hadley	Derber	9/13/81	88,114	327,614	Prod.	O
		Perry School	8/30/81	10,811	98,159	Prod.	M
	Maysville		11/11/77	8,322	58,317	Prod. and SI	M
		West Salem	2/17/81	44,778	128,299	Prod. and SI	M
	New Hamburg	Good Hope	2/ 2/79	44,580	126,367	Prod. and SI	M
	Sharon	Sharon Deep	2/26/78	256,255	1,861,804	Prod. and SI	M
Potter	Stoneboro	Lake	3/ 2/83	46,181	73,511	Prod. and SI	M
	Volant	Pardoe	7/24/81	⁴ 800	9,081	Prod.	M
	Wheatland		7/24/63	394,768	1,686,477	Prod. and SI	M
	Wolf Creek	Kilgore	10/26/66	69,979	5,505,740	Prod. and SI	L
	Utica	French Creek	7/26/81	40,475	258,786	Prod. and SI	M
	Ulysses		10/ 2/39	0	4,733,825	SI	O
		Newfield	4/ 2/62	30,471		Prod. and SI	O
			1/14/79	⁴ 1,700	588,776	Prod. and aban.	O
		Shaffer Run	5/ 1/85	81,807	201,743	Prod.	O
			11/11/58	⁴ 53,900			
Somerset	Bakersville		10/18/68	0	12,484,690	Prod. and SI	O
		Edie	8/ 4/80	19,059			
		Quemahoning	6/16/60	⁴ 2,000			
		Snyder	8/16/77	⁴ 37,300	2,216,111	Prod.	O
			5/ 9/80	25,927	740,772	Prod.	O
		Weimer	10/22/80	0	14,390	SI	O
			5/24/85	⁴ 300,000	647,865	Prod.	O
			5/28/79	⁴ 33,220	743,978	Prod.	O
			10/ 3/77	⁴ 48,400	1,241,472	Prod.	O
			5/10/79	⁴ 77,500	2,740,302	Prod.	O
Venango	Heckman Hollow		9/22/73	62,513	5,831,743	Prod.	O
	Kimmel		10/ 7/79	⁴ 54,750	964,169	Prod.	O
	Paddytown		1/ 6/78	⁴ 35,000	2,384,305	Prod.	O
	Rockwood		1/29/84	4,709	37,507	Prod.	O
	Shade Creek		4/ 5/73	⁴ 1,900	145,140	Prod.	O
	Shamrock		7/30/82	5,975,634	13,984,270	Prod., SI, and aban.	M
	Shanksville						
	Somerset East						
	Somerset West						
	Texas School	Gideon					

	McCauley Run	8/22/85	24,923	52,378	Prod.	M
	Mt. Carmel	10/ 6/86	141,839	141,839	Prod.	M
	Victory Run	2/ 1/82	⁴ 300	1,283	Prod. and SI	M
	Galloway	11/12/73	159,873	409,211	Prod.	M
	Tecza	7/ 4/86	36,442	36,442	Prod. and SI	M
	Canal	5/25/82	1,092,612	3,892,257	Prod. and SI	M
	Splane	9/22/85	16,551	35,771	Prod. and SI	M
	Takitezy	7/26/82	155,138	325,307	Prod. and aban.	M
	Irwin	12/ 1/72	⁴ 9,300	388,331	Prod. and SI	M
Warren	Campbell Creek	11/14/81	215,586	466,775	Prod. and SI	M
	Trimm	2/19/81	⁴ 137,000	545,397	Prod. and SI	M
	West Spring Creek	6/15/84	20,167	68,912	Prod.	M
		9/26/79	⁴ 115,300	930,870	Prod. and SI	M
	Freehold	8/ 5/80	⁴ 70,300	622,774	Prod. and SI	M
	Savko	9/ 5/80	⁴ 60,000	702,003	Prod. and SI	M
	Mikrut	7/21/81	324	11,562	Prod. and SI	M
	Pikes Rocks	5/ 1/81	⁴ 24,175	201,314	Prod. and SI	M
	Dry Ridge	8/25/46	⁴ 55,000	6,563,564	Prod. and SI	O
	Silver Mine	4/ 2/87	189,114	189,114	Prod.	N
	TOTAL	8/17/49	⁴ 26,180	6,886,067	Prod.	O
	St. Boniface					
	Chapel	9/13/56	⁴ 26,180	6,146,639	Prod.	O
	Kahl	10/23/62	190,879	12,184,624	Prod. and SI	O
	Baldwin	5/22/60	⁴ 140,000	} ⁴ 200,000	Prod.	O
	Beck	5/16/57	⁴ 200,000			
	Williams	2/14/58	⁴ 133,240	19,763,997	Prod.	O
	TOTAL	12/ 5/58	613,642	10,308,783	Prod., SI, and aban.	O
	Blair Oriskany Tunnel	12/ 5/58	⁴ 19,000	} ⁴ 20,000	Prod.	O
		3/10/65	⁴ 20,000			
	Distillery	9/20/87	4,863	4,863	Prod.	O
	Laurel Hill	3/ 5/81	72,364	250,858	Prod.	O
	Lookout	1/14/87	227,008	227,008	Prod.	O
	Myersbrook	7/16/82	⁴ 112,200	610,629	Prod.	O
	Seven Springs	8/ 3/66	⁴ 12,100	851,881	Prod.	O
	Weaver Road	3/15/84	146,107	956,479	Prod.	O

¹Mcf, thousand cubic feet.²Aban., abandoned; gas stor., gas storage; prod., producing; SI, shut-in.³N, Onondaga Formation; O, Oriskany Sandstone; H, Helderberg Group/Bass Islands Dolomite; S, Salina Group; L, Lockport Dolomite; M, Medina Group; T, Tuscarora Formation; BE, Bald Eagle Formation.⁴Estimated figure based on 1985 and 1986 production.

Figure 23. Deep gas production in Pennsylvania from 1985 through 1987 by producing formations.

<i>Producing formation</i>	<i>Cumulative production at end of 1984 (Mcf)¹</i>	<i>Production in 1985 (Mcf)¹</i>	<i>Production in 1986 (Mcf)¹</i>	<i>Production in 1987 (Mcf)¹</i>	<i>Cumulative production at end of 1987 (Mcf)¹</i>
Marcellus Formation (deep black shale)	58,625	17,305	0	0	75,930
Onondaga Limestone	1,685,378	146,710	86,523	900,740	2,819,351
Oriskany Sandstone, Huntersville Chert, and Ridgeley Sandstone	1,266,154,358	7,588,705	4,849,013	4,919,645	1,283,511,721
Bass Islands Dolomite and Helder- berg Group	57,731	730,217	432,865	227,867	1,448,680
Salina Group	10,866	15,336	12,346	3,721	42,269
Lockport Dolomite	² 5,264,070	168,709	32,486	69,979	5,535,244
Medina Group	120,743,474	28,523,833	29,499,694	33,698,069	212,465,070
Tuscarora Sandstone	2,783,700	356,564	404,366	221,880	3,766,510
Bald Eagle Formation	1,038,473	753,687	492,592	332,582	2,617,334
Gatesburg Formation and Little Falls Dolomite	205,200	2,000	0	0	207,200
TOTAL	² 1,398,001,875	² 38,303,066	35,809,885	40,374,483	1,512,489,309

¹Mcf, thousand cubic feet.²Corrected figure.

in 1981, has produced 4.9 Bcfg (billion cubic feet of gas) from the Upper Devonian Lock Haven Formation since the first well went into line in 1983. This is a remarkable amount for a shallow Pennsylvania gas field. The high productivity of this field has caused numerous companies to expand their programs into adjacent, unproven areas. A total of 64 wells producing solely from the Lock Haven, and an additional 3 producing from commingled Catskill and Lock Haven reservoirs, were reported in north-central Pennsylvania during 1987. Two of these wells, drilled within the limits of the main Council Run field area in Snow Shoe Township, Centre County, had very large natural open flows (greater than 5,000 Mcfgpd), indicating that the potential for finding such wells is still high. Lock Haven sandstone reservoirs in Clinton and Centre Counties are likely to continue to be among the most interesting and exciting reservoirs in Pennsylvania for years to come.

The single new Lock Haven discovery, Brace Creek field, is also the most significant well reported in 1987. The Mark Resources #1 Caseman-Gross unit well was drilled in 1987 as a 6,118-foot test of the Lower Devonian Ridgeley Sandstone in Springfield Township, Bradford County. The Ridgeley proved to be unproductive, but a show of oil between 774 and 785 feet in the Lock Haven Formation was interesting enough to plug back and test. After stimulation the well flowed enough oil to be commercial, and during 1987 produced a total of

174 bbl (Figure 2). The well is significant from several standpoints. First of all it is the first new oil field discovery in Pennsylvania in over 20 years. It is also the most remote oil production in the Commonwealth. The closest oil production occurred in the Gaines field, on the Potter-Tioga County border approximately 50 miles west of the new Brace Creek field. Production in the Gaines field was also from very shallow Lock Haven reservoirs. Establishment of production from the Lock Haven this far east will hopefully stimulate the industry to search for shallow reservoirs throughout north-central and northeastern Pennsylvania.

Reported drilling for gas in the Upper and Middle Devonian shales of northwestern Pennsylvania continued in 1987. However, the rate at which such wells are drilled and reported has been decreasing constantly since the early part of the decade. This is probably due to the proliferation of municipal laws regulating well drilling, and also to declining utility prices. Most Devonian shale wells, particularly those in Erie County, were drilled by homeowners, churches, and small businesses in order to combat the high cost of natural gas supplied by utilities during the "boom" years. A few of these property owners are still drilling shale wells, but only 3 new wells were reported in 1987, as compared with 19 in 1986 and 69 in 1985.

Although shallow drilling has historically dominated drilling activity in Pennsylvania, deep drilling generally is more interesting and more produc-

Figure 24. *Production, unit price, and total value of crude oil and natural gas produced in Pennsylvania (1960–87).*

Year	CRUDE OIL			NATURAL GAS			Total oil and gas value (dollars)
	Production ¹ (bbl)	Average yearly price (dollars/bbl)	Total value (dollars)	Production ² (Mcf) ⁴	Average yearly price ³ (dollars/Mcf) ⁴	Total value (dollars)	
1960	5,942,000	4.57	27,154,940	119,671,000	0.26	31,114,460	58,269,400
1961	5,580,000	4.76	26,560,800	98,318,000	.26	25,562,680	52,123,480
1962	5,238,000	4.63	24,251,940	87,308,000	.26	22,700,080	46,952,020
1963	5,014,000	4.63	23,214,820	92,340,000	.26	24,008,400	47,223,220
1964	5,113,000	4.48	22,906,240	85,322,000	.26	22,183,720	45,089,960
1965	4,859,000	4.20	20,407,800	82,668,000	.26	21,493,680	41,901,480
1966	4,349,000	4.33	18,831,170	91,365,000	.26	23,754,900	42,586,070
1967	4,409,000	4.35	19,179,150	89,966,000	.26	23,391,160	42,570,310
1968	4,160,000	4.35	18,096,000	87,987,000	.28	24,636,360	42,732,360
1969	4,448,000	4.29	19,081,920	79,134,000	.26	20,574,840	39,656,760
1970	4,015,000	4.27	17,144,050	77,535,000	.27	20,934,450	38,078,500
1971	3,798,000	4.47	16,977,060	76,451,000	.30	22,935,300	39,912,360
1972	3,441,000	4.60	15,828,600	73,958,000	.45	33,281,100	49,109,700
1973	3,282,000	5.73	18,805,860	78,514,000	.45	35,331,300	54,137,160
1974	3,399,000	8.43	28,653,570	82,735,000	.50	41,367,500	70,021,070
1975	3,199,000	9.26	29,622,740	84,772,000	.80	67,817,600	97,440,340
1976	2,950,000	11.51	33,954,500	89,974,000	.85	76,477,900	110,432,400
1977	2,659,000	14.22	37,810,980	92,293,000	1.00	92,293,000	130,103,980
1978	2,820,000	14.77	41,651,400	97,763,000	1.25	122,203,750	163,855,150
1979	2,817,000	23.67	66,678,390	96,313,000	1.40	134,838,200	201,516,590
1980	2,940,000	37.42	110,014,800	97,439,000	1.50	146,158,500	256,173,300
1981	3,729,000	36.33	135,474,570	122,454,000	2.00	244,908,000	380,382,570
1982	4,282,000	31.42	134,540,440	121,111,000	2.80	339,110,800	473,651,240
1983	4,491,000	28.18	126,556,380	118,372,000	3.00	355,116,000	481,672,380
1984	4,825,000	27.64	133,363,000	166,342,000	3.25	540,611,500	673,974,500
1985	4,851,000	25.12	121,857,120	150,541,000	3.15	474,204,150	596,061,270
1986	3,783,000	15.66	59,241,780	159,889,000	2.50	399,722,500	458,965,642
1987	3,302,000	17.23	56,893,460	163,318,000	2.25	367,465,500	424,358,960

¹Oil production figure courtesy of the Penn Grade Crude Association.

²Gas production figure courtesy of the American Gas Association.

³Gas prices estimated only.

⁴Mcf, thousand cubic feet.

tive on a per-well basis. This is especially true of Lower Devonian Ridgeley Sandstone wells, which may produce between 25,000 and 150,000 Mcf per year from complex reservoirs. Drilling in the Lower Silurian Medina Group sandstones accounted for the largest number of newly reported deep wells in 1987, continuing a trend set in 1978. Although production from the Medina is not as good as from the Ridgeley, Medina wells are generally shallower (and, therefore, less costly) and have a higher success rate than Ridgeley wells. The addition of potentially higher prices for Medina gas under NGPA Section 107 (High-Cost Gas) also has made these wells attractive in the last 10 years. During the past 5 years deep exploratory activity has established new production from a variety of Middle and Lower Devonian, Upper Silurian, and Upper Ordovician

rocks that have little or no previous history of production. Figure 31 illustrates the stratigraphic positions of deep formations in western Pennsylvania.

There are very few areas in Pennsylvania where the Middle Devonian Onondaga Formation has provided economically recoverable oil and gas. The most prominent of these is a “reef” well discovered in 1974 in McKean County. Although several wells have been drilled since then in an attempt to duplicate the success of the one-well Cyclone pool, none have been found to be productive. Some Onondaga production was reported in 1987, however. Most of this came from a single pool, the Meabon pool, in the North East field in Venango Township, Erie County. The Meabon pool was discovered in 1986 through the drilling of the Vineyard Oil and Gas Company #1 Meabon well, which produced both

Figure 25. *Exploratory and primary development and drilling footages reported, 1987 and 1986.*

<i>Type of well</i>	<i>1987 Wells</i>	<i>1987 Footage</i>	<i>1986 Wells</i>	<i>1986 Footage</i>	<i>Percent change in footage</i>
Exploratory					
Gas.....	54	289,721	58	298,522	
Oil	2	8,838	3	3,702	
Oil and gas.....	0	0	1	2,800	
Dry.....	20	116,175	41	192,200	
Total (percent successful)	76 (74%)	414,734	103 (60%)	497,224	-17
Development					
Gas.....	942	3,801,983	1,545	5,920,079	
Oil	942	1,154,298	1,074	1,354,686	
Oil and gas.....	9	15,655	57	137,338	
Dry.....	44	139,400	110	257,991	
Total (percent successful)	1,937 (98%)	5,111,336	2,786 (96%)	7,670,094	-33
Miscellaneous					
Gas injection	0	0	28	45,138	
Water intake	53	125,567	16	37,128	
Stratigraphic core tests.....	11	25,748	12	29,255	
Gas storage.....	6	31,960	5	2,868	
Junked.....	2	320	1	165	
Total	72	183,595	62	114,554	+60
TOTAL ALL WELLS DRILLED	2,085 (97%)	5,709,665	2,951 (95%)	8,281,872	-31

Figure 26. *Exploratory drilling in Pennsylvania by classification and type of well, 1987.*

<i>Classification and type of well</i>	<i>No. of wells</i>	<i>Footage</i>
NEW FIELD WILDCATS		
Oil	1	6,118
Dry.....	4	21,175
Subtotal.....	5	27,293
NEW POOL WILDCATS		
Gas.....	11	70,382
Oil	1	2,720
Dry.....	1	9,457
Subtotal.....	13	82,559
DEEPER POOL TESTS		
Gas.....	7	35,205
Dry.....	5	33,324
Subtotal.....	12	68,529
OUTPOST EXTENSIONS		
Gas.....	36	184,134
Dry.....	10	52,219
Subtotal.....	46	236,353
GRAND TOTAL EXPLORATORY WELLS	76	414,734

oil and gas from the Onondaga Formation at 2,650 feet. Two new wells reported in 1987 produced large quantities of natural gas from the Onondaga in the Meabon pool, including one that had an after-treatment open flow estimated at 10,000 Mcfgpd. The Vineyard Oil and Gas #6 Meabon well was completed as a combination oil and gas well with an after-treatment open flow of 7,000 Mcfgpd and 200 bbl of oil at 2,650 feet. Still others had gas flows ranging from 250 to 500 Mcfgpd. It was originally thought that the Meabon pool was related in some way to the faulted "Bass Islands trend" that runs from Erie County, New York, to Erie County, Pennsylvania. However, geophysical logs run in Meabon pool wells indicate little or no fracturing in the section. Evaluation of those logs revealed instead that the Onondaga produces from rocks that have subtle porosity and permeability variations.

Figures 32 and 33 illustrate what is probably the best method of exploring for reserves in the Onondaga in this area. Figure 32 shows the gamma-ray (GR)-log and photoelectric (PE)-log curves for the Marcellus Formation through upper Salina Group in the Vineyard Oil and Gas #1 Klick well in the Meabon pool. The PE curve is a measure of the photoelectric absorption of gamma rays introduced

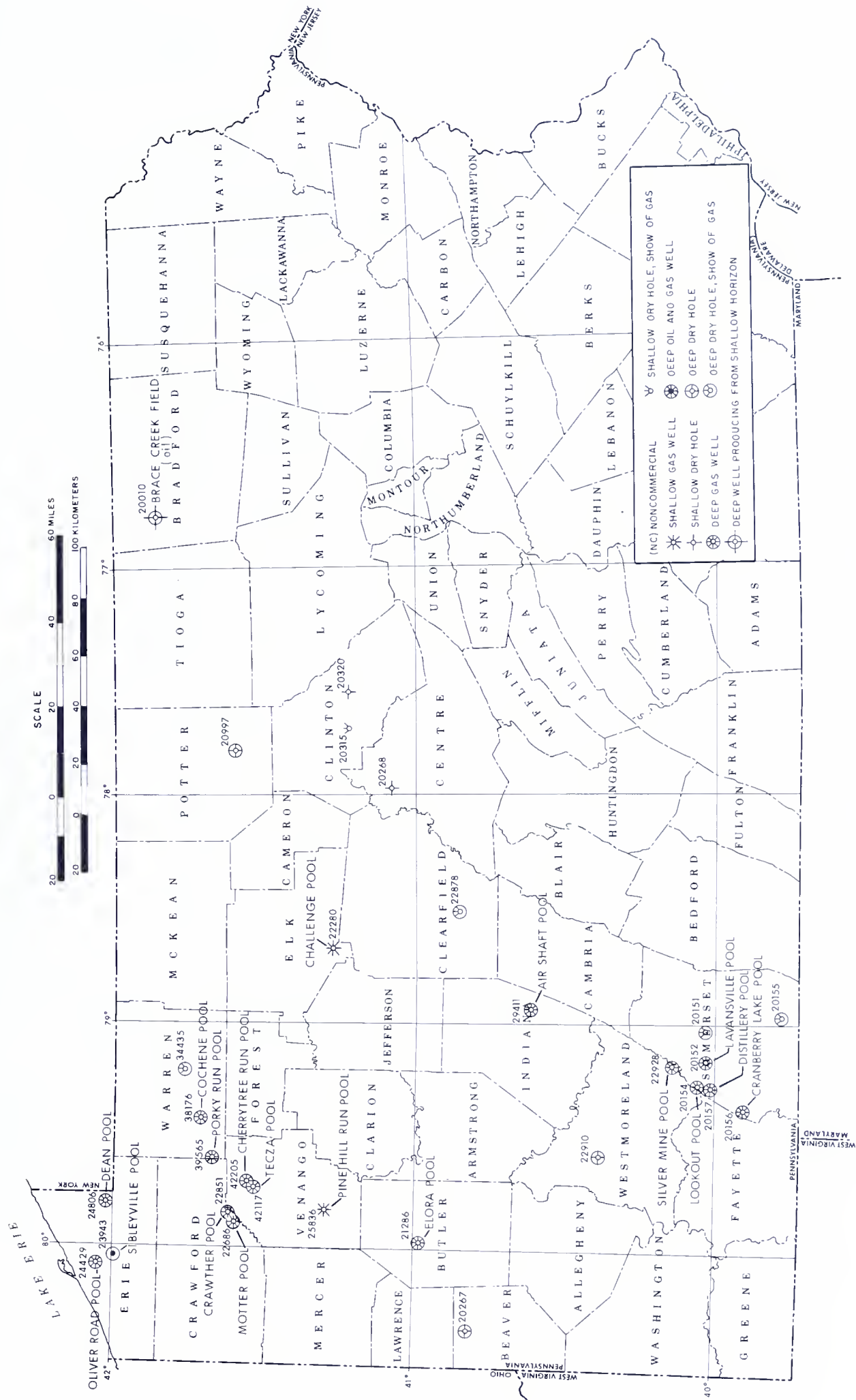


Figure 27. Map of exploratory wells in Pennsylvania reported in 1987.

Figure 28. Reported new field and new pool discoveries in Pennsylvania, 1987.

County and permit no.	Quadrangle	Operator well no. and lease	Completion date	Total depth (feet)	Name of formation or group at T.D. ³	Prod. depth (feet)	Prod. formation or group ³	Initial daily prod. (in Mcf) ¹ except where noted	Field or pool (and field) name	Explor. class ² and type of well
Bradford 015-20010	Troy	Mark Resources Corp. Caseman-Gross #1	8/12/87	6,118	Helderberg (D)	785	Lock Haven (D)	3.0 bbl	Brace Creek	NPD
Butler 019-21286	Mount Chestnut	Wilmoth Interest, Inc. Gutauskas #1	6/27/86	5,577	Salina (S)	5,260	Ridgeley (D)	110	Elora (Queen Junction)	DPD
Crawford 039-22686	Sugar Lake	Mark Resources Corp. Motter #1	3/ 7/86	5,455	Queenston (O)	5,257	Medina (S)	189	Motter (Black Ash)	DPD
Crawford 039-22851	Dempseytown	Mark Resources Corp. Melver-McAlevy #1	9/16/86	5,240	Queenston (O)	5,070	Medina (S)	110	Crawther (Fauncetown)	DPD
Elk 047-22280	Brandy Camp	Empire Exploration, Inc. NW Mining #1	2/24/87	2,655	Bradford (D)	2,337	Bradford (D)	55	Challenge (Boone Mountain)	Gas
Erie 049-23943	Cambridge Springs NE	Vineyard Oil and Gas Co. Tracy #3	8/31/84	2,720	Oriskany (D)	2,545	Onondaga (D)	0	Sibleyville (Drumlin)	Gas
Erie 049-24429	Erie South	First Assembly God Church First Assembly #2	3/24/85	2,352	Bass Islands (S)	2,102	Marcellus/ Onondaga (D)	.3 bbl	Oliver Road (Erie)	NPD
Erie 049-24806	Wattsburg	Vineyard Oil and Gas Co. Dean #1	3/27/87	3,920	Queenston (O)	3,138	Salina (S)	250	Dean (North East)	Gas
Indiana 063-29411	Strongstown	Felmont Oil Corp. Hill #1	8/13/87	8,255	Helderberg (D)	8,197	Huntersville/ Ridgeley (D)	1,700	Air Shaft (Nolo)	NPD
Somerset 111-20152	Bakersville	Berea Oil and Gas Corp. Stahl Unit #1	10/23/86	9,154	Helderberg (D)	8,980	Ridgeley (D)	984	Lavansville (Bakersville)	Gas
Somerset 111-20154	Seven Springs	Berea Oil and Gas Corp. PA Tract 665 #2	1/14/87	8,206	Helderberg (D)	7,964	Huntersville/ Ridgeley (D)	4,750	Lookout (Seven Springs)	NPD
Somerset 111-20156	Mill Run	Doran and Assoc., Inc. PA Game Tr-111A #2	6/23/87	8,278	Helderberg (D)	8,158	Huntersville/ Ridgeley (D)	852	Cranberry Lake (Ohiopyle)	Gas
Somerset 111-20157	Seven Springs	CNG Development Co. Dupre #3	9/20/87	8,329	Helderberg (D)	8,114	Huntersville/ Ridgeley (D)	1,732	Distillery (Seven Springs)	NPD
Venango 121-25836	Kennerdell	Myers Gas and Oil Conrail Railroad #8	11/ 1/79	1,616	Bradford (D)	1,578	Bradford (D)	6	Pine Hill Run (Foster Reno)	Gas
Venango 121-42117	Titusville South	Cabot Oil and Gas Corp. Tecza #1	7/ 4/86	5,822	Queenston (O)	5,755	Medina (S)	600	Tecza (Hamilton Corners)	DPD
Venango 121-42205	Titusville South	Quaker State Oil Refining Bell #1	3/10/87	5,881	Queenston (O)	5,780	Medina (S)	800	Cherrytree Run (Toonerville)	DPD
Warren 123-38176	Tidioute	Quaker State Oil Refining Dunlap #1	2/ 1/86	5,645	Queenston (O)	5,565	Medina (S)	500	Cochene (Tidioute)	Gas
Warren 123-39565	Grand Valley	Doran and Assoc., Inc. Burrows #1	11/ 5/86	5,614	Queenston (O)	5,515	Medina (S)	2,100	Porky Run (Dotyville)	DPD
Westmoreland 129-22928	Ligonier	CNG Development Co. Commonwealth of PA #2	1/21/87	8,438	Helderberg (D)	8,170	Huntersville (D)	15,000	Silver Mine (Linn Run)	NPW

¹Mcf, thousand cubic feet.²NPD, new field discovery; DPD, deeper pool discovery.³(D), Devonian; (S), Silurian; (O), Ordovician.

Figure 29. Selected exploratory failures reported in Pennsylvania, 1987.

County and permit no.	Quadrangle	Operator Well no. and lease	Completion date	Total depth (feet)	Name of formation or group at T.D. ¹	Explor. class ²
Beaver 007-20267	Beaver Falls	Meridian Exploration Corp. Bell #1	12/ 1/86	4,906	Tully (D)	DPW
Centre 027-20268	Snow Shoe	Felmont Oil Corp. Litke #34	8/27/87	4,897	Lock Haven (D)	NFW
Clearfield 033-22878	Irvona	Fairman Drilling Co. Hamilton #1	7/28/87	8,241	Helderberg (D)	DPW
Clinton 035-20315	Howard NW	Eastern States Exploration Co. Commonwealth of Pennsylvania Tract 344 #1	12/ 2/85	4,790	Lock Haven (D)	NFW
Clinton 035-20370	Farrandville	Felmont Oil Corp. Commonwealth of Pennsylvania Tract 713 #2	9/10/87	5,182	Lock Haven (D)	NFW
Potter 105-20997	Short Run	Grazis, Stanley L. Commonwealth of Pennsylvania Tract 365 #3	5/26/86	6,255	Helderberg (D)	DPW
Somerset 111-20151	Somerset	Berea Oil and Gas Corp. Zborovancik #1	11/20/86	9,457	Ridgeley (D)	NPW
Somerset 111-20155	Wittenburg	Huntley and Huntley, Inc. Summy #1	8/ 4/87	6,306	Shriver (D)	NFW
Warren 123-34435	Warren	Quaker State Resources Corp. Bunker Lot 541 #042	1/31/84	6,096	Queenston (O)	DPW
Westmoreland 129-22910	Slickville	CNG Development Co. Shuster #1	5/28/87	7,826	Shriver (D)	DPW

¹(D), Devonian; (O), Ordovician.²NFW, new field wildcat; NPW, new pool wildcat; DPT, deeper pool test.

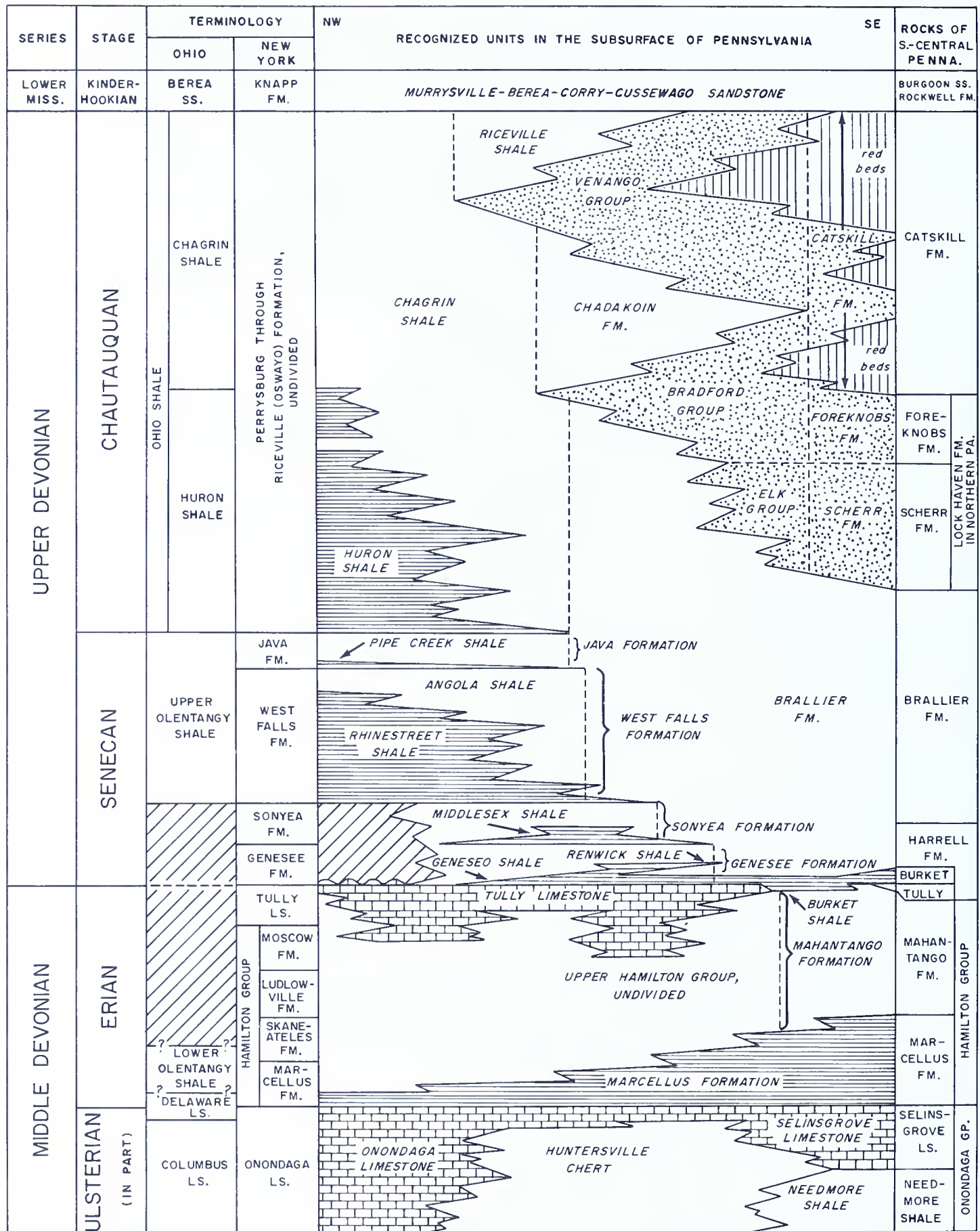


Figure 30. Schematic diagram of Upper and Middle Devonian stratigraphic units from the surface and subsurface of western Pennsylvania.

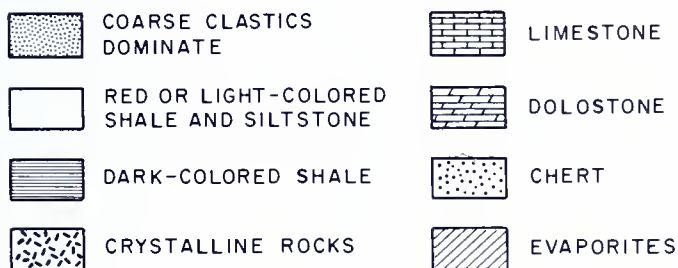
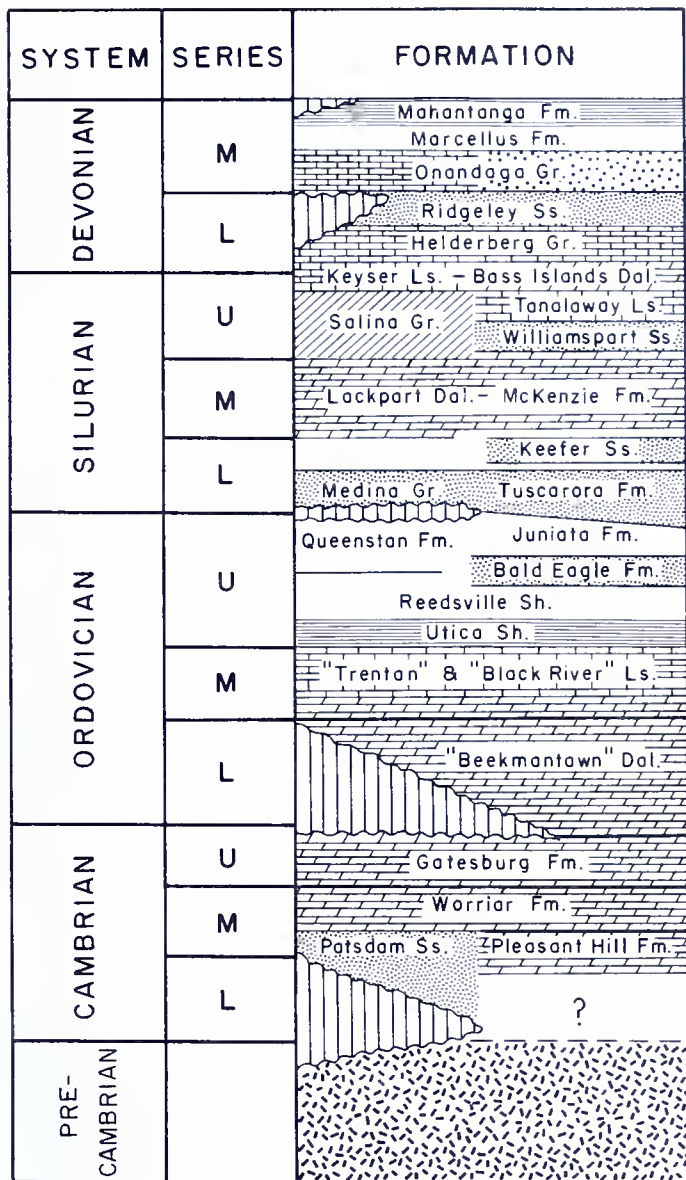


Figure 31. Generalized diagram of the major deep (Tully or deeper) formations occurring in the subsurface of western Pennsylvania.

into the formation from the logging tool. Its response is closely related to the mineral composition of the formation matrix. Readings taken from the PE, bulk density, and neutron curves within the interval perforated and stimulated, shown on Figure 32 by the shaded box next to the GR curve, were plotted on a matrix identification plot (Figure 33).

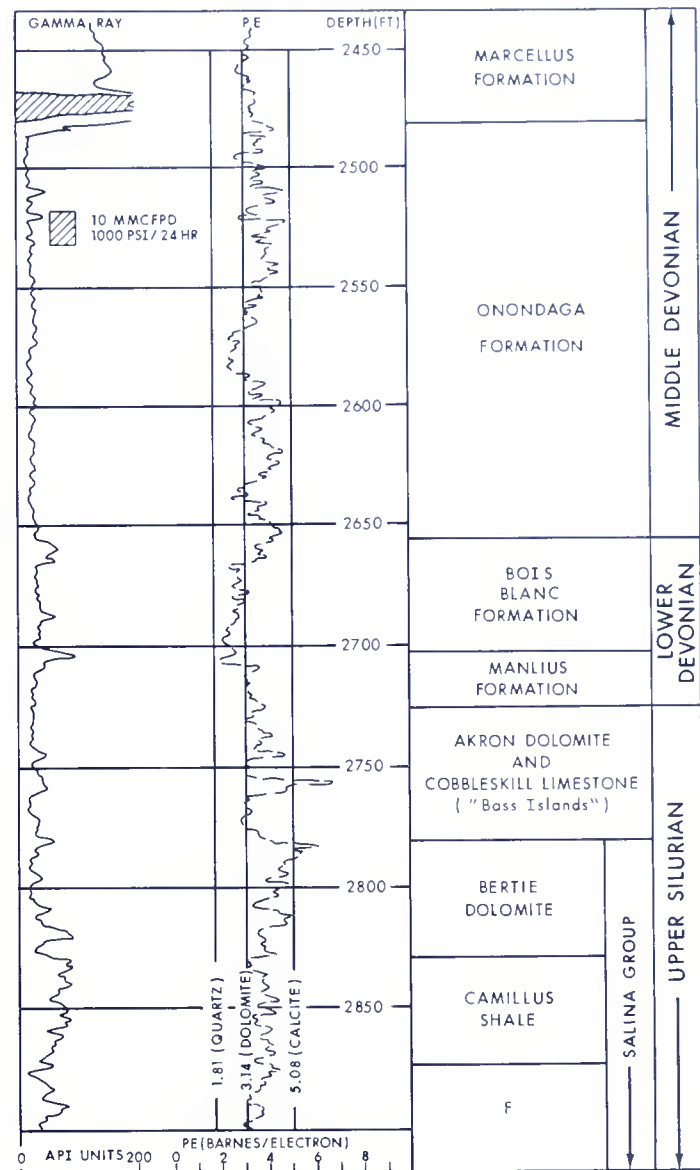


Figure 32. Diagram showing the gamma-ray-log and photoelectric (PE)-log signatures of the Vineyard Oil and Gas #1 J. Klick well in Venango Township, Erie County. Formation boundaries were determined from gamma-ray-neutron-density log picks. The small shaded box to the right of the gamma-ray curve in the Onondaga Formation indicates the interval producing natural gas.

The plots reveal a complex matrix mineralogy of quartz, calcite, and either dolomite or clay minerals. General lithologic descriptions of the Onondaga from northwestern Pennsylvania indicate that dolomite and sandstone are not represented in the Onondaga Formation, but that chert and shale are common accessory constituents of the formation. The gas-bearing zone in the well is indicated by points plotting upward in the composition triangle. It seems obvious from these figures that the Meabon

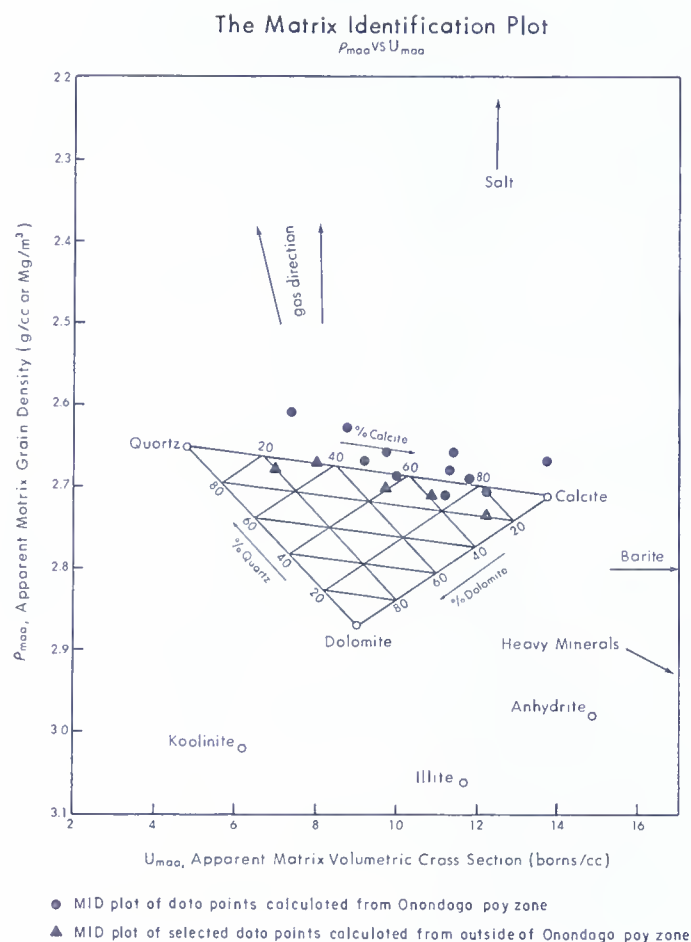


Figure 33. Matrix identification chart showing the plotted locations of data points calculated from the logs of the Klick well shown in Figure 32. Matrix identification chart based on Schlumberger Well Services crossplot chart CP-21.

pool is primarily a subtle trap in the cherty facies of the Onondaga Formation. It may be that similar trapping mechanisms are involved in other Onondaga pools in Erie County, but this has not been ascertained.

Two small Onondaga pools were reported discovered in Erie County in 1987. These included the (1) Sibleyville pool in the Drumlin field, Waterford Township, discovered through the drilling of the Vineyard Oil and Gas #3 Tracy well, which had an after-treatment open flow of about 1 bbl of oil per month; and (2) Oliver Road pool in the Erie field, Summit Township, discovered through the drilling of the First Assembly of God Church #2 Fee well, which had a commingled natural open flow from the Middle Devonian Marcellus Formation and Onondaga Formation of 150 Mcfgpd.

Production from the Lower Devonian Ridgeley Sandstone in the central part of western Pennsylvania, and its equivalent in northwestern Pennsyl-

vania, the Oriskany Sandstone, is typically high where it occurs. Ridgeley production is often commingled with production from the overlying Middle Devonian Huntersville Chert in structural plays related to intensive fracturing and faulting on the depressed-core anticlines in the eastern portion of the Appalachian Plateau. Oriskany production, however, is most often due to the coincidence of subtle structures and the patchy distribution of sandstone. Gas is often found where a large pod of sandstone occurs in association with a gentle upwarp due to salt movement or dissolution in the Salina Group. These reservoirs typically are short-lived due to water invasion, but the production may be very large, and stimulation of the reservoir is rarely necessary. Two new Oriskany wells reported from Erie County in 1987 are worth mentioning. Both wells, the Chautauqua Energy #1 Kozlowski/Bernard well and the Richard B. Cross #3 Fee well, were drilled into the Car Wash pool in the Erie field, Millcreek Township. The Kozlowski/Bernard well reported a natural open flow of 5,000 Mcfgpd from the Oriskany at 1,750 to 1,786 feet. The Cross well had a reported 4,500 Mcfgpd natural open flow from the Oriskany at 1,753 feet. Such open flows are typical of Oriskany wells that produce gas, but because of the problems of water invasion neither well is expected to produce longer than 5 years.

In many of the deeper fields in the eastern portion of the Appalachian Plateau, the Huntersville/Ridgeley continues to be an important target for drilling. In 1987 Pennsylvania's oil and gas industry reported 21 new wells drilled to recover gas from Huntersville/Ridgeley reservoirs; of these, 13 were successful endeavors. One unsuccessful new field wildcat was drilled in Somerset County, 3 unsuccessful deeper pool tests were drilled in Beaver, Clearfield, and Westmoreland Counties, and 2 unsuccessful new pool wildcats were drilled in Potter and Somerset Counties. Seven of the successful new Huntersville and/or Ridgeley wells were classified as deeper pool tests or new pool wildcats, and the remaining 6 wells were classified as either development or outpost/extension wells. The 7 new pools include the (1) Elora pool in the Queen Junction field, Butler County; (2) Air Shaft pool in the Nolo field, Indiana County; (3) Lavansville pool in the Bakersville field, Somerset County; (4) Lookout pool in the Seven Springs field, Somerset County; (5) Cranberry Lake pool in the Ohiopyle field, Somerset County; (6) Distillery pool in the Seven Springs field, Somerset County; and (7) Silver Mine pool in the Linn Run field, Westmoreland County. Of these, the most interesting is the Elora pool in

Butler County. The Wilmoth Interests #1 Gutauskas well was drilled to the Salina Group at 5,577 feet and completed in the Ridgeley at 5,260 feet. The initial open flow was small, but the well began flowing better after being shut in and allowing the stimulation fluids to bleed out of the fractures. This well is situated about 1 mile south of the "Oriskany no-sand area," a stratigraphic and porosity pinchout zone whose proximity is responsible for much of the production in fields such as the giant Punxsutawney-Driftwood field in Clearfield, Elk, and Cameron Counties and the Leidy field in Clinton and Potter Counties. Discovery of the Elora pool extended this porosity play in the Ridgeley Sandstone approximately 50 miles west of the nearest such production, the Elk Run pool in the Frostburg field, Jefferson County, and should pave the way for new drilling along the southern fringe of the "no-sand area."

The "Bass Islands" trend of New York and Pennsylvania consists of faulted rocks ranging from the lower Onondaga Formation through the upper Salina Group. The trend was first known for certain in Pennsylvania in 1983 when the Greenley pool was discovered in Waterford Township, Erie County. The new Dean pool was reported in 1987 with the successful completion of the Vineyard Oil and Gas #1 Dean well in the North East field, Erie County. The well was originally drilled to test the Lower Silurian Medina Group at 3,920 feet, but was stimulated in the Salina between 3,105 and 3,138 feet. The well flowed 250 Mcfgpd.

As in past years, the Lower Silurian Medina Group was the most actively drilled deep formation in Pennsylvania in 1987. During the year, 347 successful Medina wells were reported from the five northwestern counties of Erie, Crawford, Mercer, Venango, and Warren. Of these, 346 were gas wells and 1 was a combination oil and gas well. Because of the large amount of drilling for Medina reserves in northwestern Pennsylvania since 1978, there is little new area to explore, and very few new exploratory wells are reported in any given year. Therefore, the number of exploratory wells typically decreases from one year to the next regardless of the total number of wells reported. The one exploratory category that is continually reported is the deeper pool test. Northwestern Pennsylvania, particularly in Venango and Warren Counties, contains numerous small oil fields, most of them over 100 years old. Each of these fields is considered a discrete historical entity, even though many are only a few square miles in extent. Medina operators drilling in these fields for the first time, therefore,

"discover" new reserves in deeper pools in the fields.

There were 6 new Medina pools reported in Pennsylvania in 1987, 2 each in Crawford, Venango, and Warren Counties. These new pools included the (1) Motter pool in the Black Ash field, Crawford County; (2) Crawther pool in the Fauncetown field, Crawford County; (3) Tecza pool in the Hamilton Corners field, Venango County; (4) Cherrytree Run pool in the Toonerville field, Venango County; (5) Cochene pool in the Tidioute field, Warren County; and (6) Porky Run pool in the Dotyville field, Warren County. In addition, an unsuccessful deeper pool test was drilled in the Morrison Run field in Warren County.

Cambrian/Ordovician tests are rare in Pennsylvania, so that when one occurs it makes news. In 1981 Cardinal Oil Company drilled the #1 Ewig well in the Conneaut field along the trend of historical production in the Upper Cambrian Gatesburg Formation. Two previously successful wells, completed in the mid-1960's, were the discovery wells for the Scull and Beaver Center pools in the Conneaut field, where subtle structure coincided with an unconformity and associated porosity development at the top of the Cambrian section. The Ewig well was drilled approximately halfway between the two pools, but stimulation of the Cambrian dolomites proved unsuccessful. Cardinal then applied to the Department of Environmental Resources (DER) for a permit to use the well for brine disposal, and the record was kept in suspense pending DER action. Finally, in 1987, Cardinal stimulated the Medina section and obtained a small open flow of 100 Mcfgpd.

North Central Oil Company, which drilled a 10,500-foot test of the Triassic-Jurassic Newark Supergroup in the Newark basin of southeastern Pennsylvania in 1985, drilled and plugged a second well in 1987. This second well, drilled in Montgomery County, was abandoned before the end of 1987, but little is known about it because the company has not yet submitted a completion report.

GEOPHYSICAL ACTIVITY IN PENNSYLVANIA

The seismograph is the principal nondrilling exploratory tool used in Pennsylvania for the exploration of oil and gas. The use of seismic tools is advantageous in that it can give approximate to excellent indications of the attitude of rocks (whether they are folded, faulted, tilted, or flat lying) and the depth of potential hydrocarbon reservoirs by

measuring the travel time for vibrations generated at the surface to reach the rock. Mechanically generated seismic pulses, especially Vibroseis, and explosive techniques, principally dynamite, are the most widely used in Pennsylvania. Seismic work is typically performed by contracted crews, and the intensity of activity is measured in crew-months.

Seismic activity in Pennsylvania increased in 1987, up 71 percent to 7.5 crew-months from the 4.39 crew-months reported in 1986. Only four companies were reportedly involved in seismic activity in 1987; they were CNG Development, East Resources, Columbine Natural, and Felmont Oil Corporation. Surveys were reported in Bradford, Clinton, Erie, Indiana, Lycoming, Somerset, and Sullivan Counties.

ACTIVITIES ON STATE FOREST AND PARK LANDS

Total income from oil and gas activities on Pennsylvania State Forest and Park lands during 1987 amounted to \$4,027,744.00. This income was produced from rentals, including bonuses from lease sales, royalties, gas storage rentals, pipeline and compressor station rentals, and seismic surveys. Royalty payments for the year amounted to \$1,343,585.61 for 4,353,476 Mcf of gas and \$234.18 for 98.6 bbl of oil produced on State land or from unitized acreage. Rentals for existing exploratory acreage and past leasing programs totaled \$1,693,045.34, and gas storage rentals totaled \$970,508.89. Other income for seismic surveys and for pipeline and compressor station rentals totaled \$20,370.38.

During the year 191,613 acres of State Forest and Park lands was offered for bid for oil and gas exploration in 71 tracts. Of this total, 23 tracts comprising 70,678 acres were successfully bid and placed under lease in 1987.

At the end of 1987, a total of 561,758 acres of State Forest and Park lands was under lease for oil and gas exploration and development. In addition, the state has another 100,493 acres under lease for gas storage located in 10 different gas storage fields.

PROJECTS IN PROGRESS IN 1987, OIL AND GAS GEOLOGY DIVISION

OIL AND GAS BASE MAPS

The Oil and Gas Geology Division continues to make available to the public a series of 7.5-minute

oil and gas base maps. The series covers all of western Pennsylvania's oil and gas fields and the areas of central and eastern Pennsylvania where exploratory drilling has occurred. The series is accessible as ozalid ("blue-line") reproductions of standard U.S. Geological Survey 7.5-minute topographic maps overprinted with well symbols and identifying numbers. The topographic portion of each map is subdued so that the well information stands out, but is still legible on a blue-line reproduction. New well information is added periodically during updating of the map series.

Details for purchasing base maps can be obtained by contacting the Pennsylvania Geological Survey, Oil and Gas Geology Division, 121 South Highland Avenue, Pittsburgh, PA 15206-3988, telephone 412-645-7057. When requesting copies of the maps, please provide the 7.5-minute topographic map name of each map desired. Figure 34 shows those portions of Pennsylvania for which base-map coverage is available.

OIL AND GAS RESERVOIR ROCKS OF PENNSYLVANIA

by Christopher D. Laughrey,
Robert M. Harper, and
Antonette K. Markowski

Work on the reservoir rocks project continued during 1987, and was concluded early in 1988. The study includes a compilation of petrologic and petrophysical data from the various hydrocarbon reservoir rocks of the Commonwealth. The report contains discussions and illustrations of the various reservoir characteristics of the producing formations in various areas of Pennsylvania. The study provides the following information: (1) an outline of the mineralogy, texture, diagenesis, porosity, and permeability characteristics of the principal reservoir rocks in each of the general productive areas of the Commonwealth; (2) an explanation of the variations from low-permeability ("tight") to high-permeability ("sweet") zones in seemingly similar reservoir situations; (3) a description of the environments and reservoir configurations of gas and oil pools in Pennsylvania; and (4) a discussion of the potential reservoir and completion problems that operators may expect to encounter in different pools in the state.

The study entails the compilation of thin-section and scanning-electron-microscope (SEM) petrographic data, core analyses, X-ray diffraction data, and geophysical information. The completed report



Figure 34. Index maps of available (shaded) 7.5-minute oil and gas base maps.

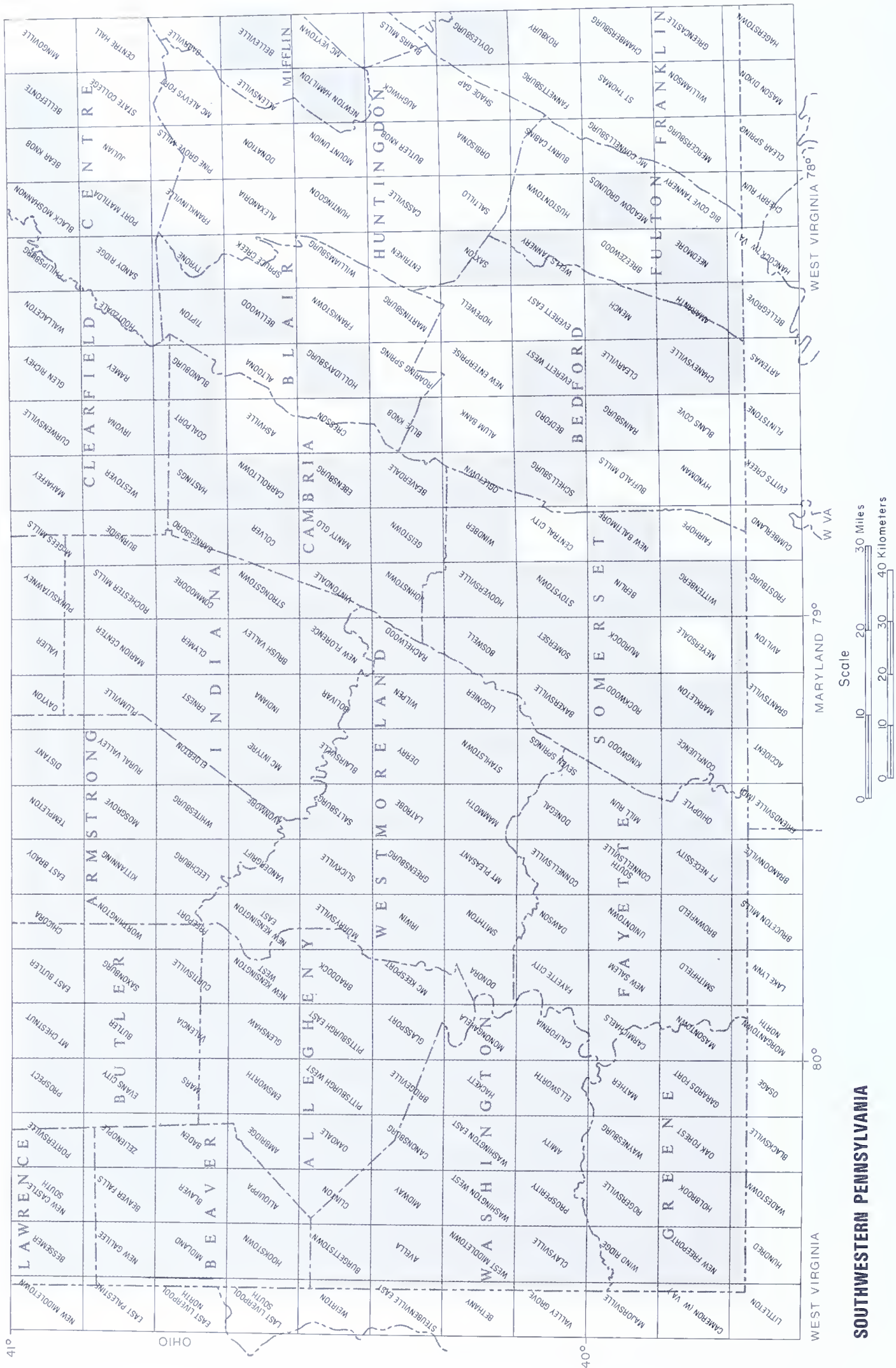


Figure 34. (Continued).



Figure 34. (Continued).

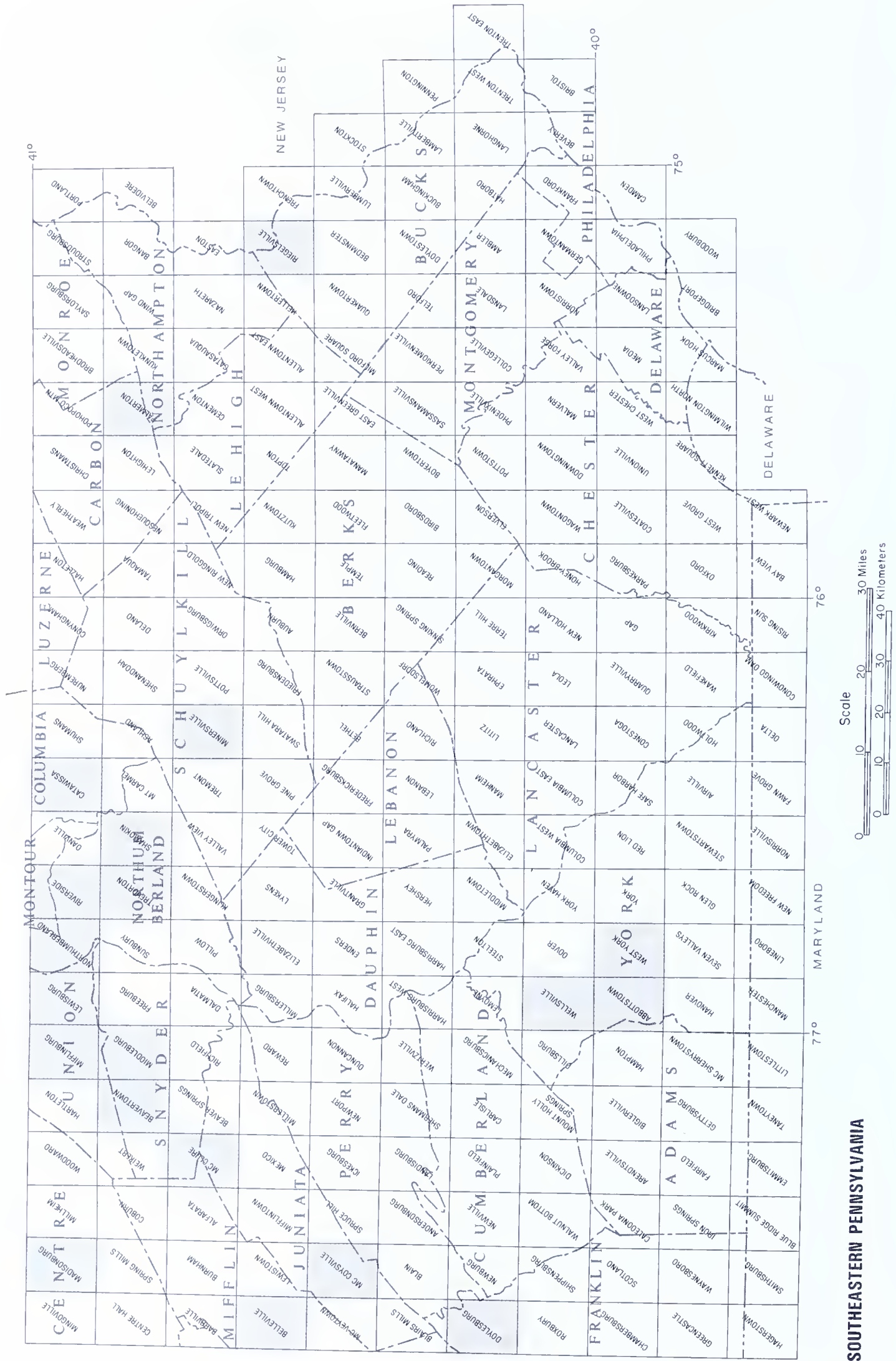


Figure 34. (Continued).

should provide operators with a comprehensive guide to geological appraisal of Pennsylvania's reservoir rocks and make available fundamental data for planning profitable exploration and exploitation programs.

For more information on the reservoir rocks project, contact Christopher D. Laughrey at the Oil and Gas Geology Division offices in Pittsburgh, telephone 412-645-7057.

GEOCHEMISTRY OF PETROLEUM SOURCE ROCKS IN PENNSYLVANIA

by Christopher D. Laughrey

The Oil and Gas Geology Division has initiated a reconnaissance geochemical study of petroleum source rocks in Pennsylvania. Petroleum source rocks will be identified and correlated to reservoir hydrocarbons through determinations of organic content, kerogen types, stable isotope chemistry, and compositions of solvent-extractable hydrocarbons and nonhydrocarbons. Thermal maturities will be determined from optical and physicochemical properties of kerogens and by mathematical modeling. This regional geochemical study should prove useful in determining the patterns of hydrocarbon generation and migration within exploration and development areas in Pennsylvania. Such data are critical to the future development of petroleum reservoirs in the state's mature fields, and the discovery of new fields in unexplored portions of Pennsylvania.

The project is scheduled for completion in the first half of 1989.

PRELIMINARY FEASIBILITY STUDY OF THE COAL-BED METHANE RESOURCES IN PENNSYLVANIA

by Antonette K. Markowski

The Oil and Gas Geology Division has begun a preliminary study of the feasibility of producing natural gas from Pennsylvanian coals in the western half of the state. Only minor work has been conducted on this little-known but valuable natural resource in the Commonwealth. Because of the growing interest nationwide in the degasification of deep-lying coals having high methane contents, however, this project should provide useful information on a regional basis pertaining to coal-bed methane resources and uses in Pennsylvania. It is hoped that the project will promote the identification, recovery, and prudent use of these resources within the Com-

monwealth. The general objectives of the study are to identify the potential for coal-bed methane production and, assuming that this potential is high, to (1) identify key areas having high methane content; (2) identify possible trends of high methane content; (3) correlate methane content with various coal seams by rank, thickness, and burial depth; and (4) assess the geologic implications of coal-bed methane as a supplemental and/or alternative energy source.

This project, which is scheduled to be completed in the summer of 1989, should be of general interest to the coal-mining industry, the oil and gas industry, academic and industrial customers using cogeneration power plants, and the general public.

OPEN-FILE REPORTS AND OTHER DATA AVAILABLE

The following reports and other data are available on open file at the Pennsylvania Geological Survey, Oil and Gas Geology Division, 7th Floor, Highland Building, 121 South Highland Avenue, Pittsburgh, PA 15206-3988.

Open-file report no.

- 1 *Surface to Middle Devonian (Onondagan) Stratigraphy, Part I (STOMDES)*, 1972, by D. R. Kelley and W. R. Wagner, 15 p., 8 cross sections, vertical scale 1 inch = 100 feet.
- 2 *Deep Sand Exploration and Gas Developments in Pennsylvania*, 1986, by L. J. Balogh, 2 map sheets, scale 1:250,000.
- 3 *Salina or Equivalent and Deeper Penetrations of Pennsylvania*, 1973, by D. R. Kelley and L. J. Balogh, 1 map, scale 1:500,000 (last updated in 1979).
- 4 *Tully and Deeper Formations, Brine Analysis of Pennsylvania*, 1973, by D. R. Kelley, L. A. Heeren, and others, 1 chart and map, scale 1:500,000.
- 5 *Stratigraphic Framework of the Greater Pittsburgh Area, Parts I and II*, 1972, by W. R. Wagner and W. S. Lytle, 20 p., 9 sections in 13 sheets.
- 6 *Active Gas Storage Areas Map of Pennsylvania*, 1981, by L. J. Balogh, 1 map, scale 1:500,000 (updated as needed).
- 7 *Subsurface Rock Correlation Diagram, Allegheny Plateau, Pennsylvania*, 1979, by J. A. Harper, 1 sheet.

There are also over 100,000 drillers' records and logs, along with approximately 8,000 geophysical logs, on open file at the Pennsylvania Geological Survey's Pittsburgh office. Approximately 44,000 of the 100,000 records on file consist of well-data cards compiled by the U.S. Geological Survey and the Pennsylvania Geological Survey between 1900 and 1970 as the bases of topographic-map quadrangle reports. In addition, the Survey has a sample library containing drill cuttings from approximately 1,200 wells, and a core storage library containing cores from 48 wells, including the five wells cored under the U.S. Department of Energy's Eastern Gas Shales Program. All cuttings and cores are available for inspection and study.

SUMMARIZED RECORDS OF REPORTED DEEP WELLS¹ IN 1987

by Christopher D. Laughrey and
Cheryl L. Cozart

The information shown in Figure 36 was compiled mainly from drillers' logs, location plats, and geophysical logs received from the Bureau of Oil and Gas Management, as well as personal communication with oil and gas operators. Well records are filed with the Bureau of Oil and Gas Management by permit numbers. The Oil and Gas Geology Division, Pennsylvania Geological Survey, files the records in order by county, 7.5-minute topographic map, and permit number.

Most of the formation tops and total depths recorded in Figure 36 were picked from geophysical

Figure 35. *Types of geophysical logs and abbreviations.*

Caliper	CAL
Cement bond log	CBL
Continuous directional	CDR
Compensated density log	CDL
Compensated neutron log	CNL
Dipmeter	DIP
Dual laterolog	DLL
Dual induction log	DIL
Electromagnetic propagation	EPT
Fracture identification log	FIL
Gamma ray	GR
Gamma-ray spectralog	GRSPECTAL
Guard	GD
Induction log	IL
Computer interpretative	INT
Laterolog	LL
Merge	MERGE
Microspherically focused log	MSFL
Perforating collar log	PCL
Sibilation	S
Sonic	SON
Temperature	T
3-D velocity	VEL
Radioactive tracer	TRACER
Sidewall neutron porosity	SNP
Variable density log	VDL

logs of many varieties (see Figure 35 for a list of these logs and their abbreviations). The logs received for a particular well are listed in Figure 36 along with the logged interval. Lack of this information indicates that no geophysical logs were received and that formation picks were taken directly from the drillers' logs. The records are listed alphabetically by county and numerically by permit number.

¹Wells that penetrate rocks of Middle Devonian or older age.

Figure 36. Summarized records of reported deep wells in 1987 that penetrated rocks of Middle Devonian or older age.

COUNTY Permit Number	Beaver 007-20267-P	Bradford 015-20010-P	Butler 019-21286	Clearfield 033-22878-P	Crawford 039-20907	Crawford 039-21264	Crawford 039-22250	Crawford 039-22313	Crawford 039-22314	Crawford 039-22449
NAME OF WELL	John Bell #1	Caesman-Gross #1	Albert Gutasakas #1	Aldean Hamilton Unit #1	Robert Ewig #1	Janice Gandelot #1	Kathryn Stan #2	W. J. Hyde #4	W. J. Hyde #3	J. & E. Miller #3
OPERATOR	Meridian Exploration #721	Mark Resources Corporation	Wilmoth Interests, Inc.	Fairman Drilling Company #F-4581	Cardinal Oil Company #80-41	Cabot Oil & Gas Corporation	Headville Forging, Inc.	Meridian Oil & Gas Enterprises, Inc.	Meridian Oil & Gas Enterprises, Inc.	Mark Resources Corporation
TOWNSHIP	Big Beaver	Springfield	Clay	Knox	Beaver	East Head	West Head	Beaver	Spring	Wayne
QUADRANGLE	Beaver Falls	Troy	Mount Chestnut	Irvona	Beaver Center	Cochranston	Headville	Beaver Center	Beaver Center	Sugar Lake
LATITUDE	7,370 ft. S 41°50'00"	5,000 ft. S 41°52'30"	10,420 ft. S 41°00'00"	12,660 ft. S 40°52'30"	500 ft. S 41°47'30"	3,700 ft. S 41°37'30"	14,400 ft. S 41°42'30"	2,700 ft. S 41°50'00"	2,700 ft. S 41°50'00"	14,750 ft. S 41°35'00"
LONGITUDE	3,380 ft. W 80°20'00"	3,750 ft. W 76°45'00"	3,150 ft. W 79°57'30"	1,000 ft. W 78°30'00"	10,000 ft. W 80°22'30"	10,000 ft. W 80°02'30"	800 ft. W 80°10'00"	10,700 ft. W 80°22'30"	8,000 ft. W 80°22'30"	4,900 ft. W 79°55'00"
DATE COMPLETED	12-1-86	7-28-87	7-27-86	7-28-87	1-9-81	8-1-81	9-25-84	12-28-84	12-30-84	7-7-85
ELEVATION	1077 GR	1531 GR	1230 GR	1684 GR	1025 GR	1390 GR	1120 GR	1009 GR	888 GR	1557 GR
LOGS RECEIVED AND LOGGED INTERVALS		COL/CNL: 0-6115	COL: 200-1858 (used driller's tops)	COL/CNL: 4400-8238 OLL/GR: 4400-8226 CYBER: 8100-8225 COL/CNL: 982-4683	COL/GR: 50-6970 GR: 5500-6929 OLL: 2066-6946 LTD: 2656-6940			GO: 3150-3540		COL/CNL: 0-4775 DLL/GR: 600-4780 GR: 3950-5570 INT: 2400-4134
TULLY LIMESTONE	4585-4906	4438-	4892-	7236-	2062-	3158-	2660-			3728-
ONONDAGA LIMESTONE HUNTERSVILLE CHERT		5764-	5123- 5132-	8123- 8138-	2231-	3354-	2856-	2192-	2046-	3964-
ORISKANY SANDSTONE RIDGELEY SANDSTONE		5857-	5243-	8194-	2468-	3542-		2430-	2304-	4106-
SILURIAN-DEVONIAN CARBONATES		5893-	5272-	8210-	2482-	3556-	3044-	2440-	2314-	4132-
SALINA GROUP LOCKPORT DOLOMITE			5486-		2554- 3176-	3838- 4268-	3260- 3810-	2694- 3038-	2372- 2978-	4232- 4928-
ROCHESTER SHALE IRONDEQUOIT DOLOMITE					3420- 3486-	4629- 4692-		3476-	3226- 3282-	5253- 5314-
GRIMSBY FORMATION CAROT HEAD SHALE WHIRLPOOL SANDSTONE					3524- 3653- 3697-	4733- 4872- 4912-	4192- -4394	3512- 3640- 3666-	3314- 3402- 3484-	5368- 5482- 5542-
QUEENSTON FORMATION					3704-	4924-	4394-	3672-	3492-	5555-
PRODUCING FORMATION		Lock Haven	Ridgeley		Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL		774-785	5245-5260		3584-3608		4266-4313	3531-3565	3359-3399	5410-5478
TOTAL DEPTH	4906	6118	5577	8241	6970	4986	4520	3700	3545	5591
DEEPEST FORMATION REACHED	Tully	Helderberg	Salina	Helderberg	Warrior	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	Plugged and abandoned Deeper pool test Harbison Hollow field	Dry deep new field wildcat Plugged back to 1380 feet, producing shallow oil Brace Creek field	110 Mcf AF 1,300 psi/48 hrs. Deeper pool discovery Elora pool Queen Junction field	Plugged and abandoned Deeper pool test Madera field	Reedville well- Gatesburg 6194- Marathon 6708- 100 Mcf AF development Indian Springs pool Conneaut field	Dry and abandoned development Papenfuss field	370 Mcf AF 1,350 psi/72 hrs. development West Head Conneaut field	470 Mcf AF 1,100 psi/72 hrs. development Indian Springs pool Conneaut field	250 Mcf AF 1,050 psi/72 hrs. development Stone Run pool Conneaut field	850 Mcf AF 1,475 psi/72 hrs. development Wilton Mills pool Lake Creek field

Figure 36. (Continued).

COUNTY Permit Number	Crawford 039-22519	Crawford 039-22590	Crawford 039-22624	Crawford 039-22631	Crawford 039-22645	Crawford 039-22661	Crawford 039-22676	Crawford 039-22685	Crawford 039-22686	Crawford 039-22689
NAME OF WELL	John & Mary Morgan #1	Yucha #1	Shered #1	William Hay #1	McElhinny #1	George Coffin #1	James McLallen #1	R. & M. Bly #1	J. Motter #1	J. Cerro #1
OPERATOR	N.E.A. Cross Company	Meridian Exploration #366	Meridian Exploration #363	Meridian Exploration #367	Meridian Exploration #376	Kaltaas Oil Company	Meridian Exploration #398	Mark Resources Corporation	Mark Resources Corporation	Mark Resources Corporation
TOWNSHIP	Rockdale	Cambridge	Venango	Rockdale	Venango	Rockdale	Bloomfield	Troy	Randolph	Wayne
QUADRANGLE	Millers Station	Cambridge Springs	Edinboro South	Millers Station	Cambridge Springs	Millers Station	Millers Station	Dempseytown	Sugar Lake	Sugar Lake
LATITUDE	14,700 ft. S 41°52'30"	10,840 ft. S 41°52'30"	9,900 ft. S 41°52'30"	10,650 ft. S 41°52'30"	2,360 ft. S 41°50'00"	13,700 ft. S 41°52'30"	670 ft. S 41°50'00"	9,300 ft. S 41°37'30"	12,000 ft. S 41°37'30"	3,100 ft. S 41°35'00"
LONGITUDE	1,350 ft. W 79°57'30"	4,500 ft. W 80°00'00"	130 ft. W 80°07'30"	2,350 ft. W 79°57'30"	7,300 ft. W 80°05'30"	8,860 ft. W 79°57'30"	1,950 ft. W 79°52'30"	9,350 ft. W 79°50'00"	1,200 ft. W 79°52'30"	3,450 ft. W 79°55'00"
DATE COMPLETED	8-26-85	9-6-86	8-10-86	8-16-86	11-16-86	11-4-86	10-6-86	2-20-86	3-7-86	2-22-86
ELEVATION	1220 GR	1305 GR	1292 GR	1330 GR	1265 GR	1230 GR	1664 GR	1485 GR	1467 GR	1520 GR
LOGS RECEIVED AND LOGGED INTERVALS		PCL: 4075-4207	CDL/CNL: 429-4159 DIL/DLL: 429-4154 PCL: 3920-4066 INT: 3885-4030	CDL/CNL: 423-4333 DIL/DLL: 412-4334 INT: 2885-3120 PCL: 4128-4203	CDL/CNL: 422-4173 DIL/DLL: 422-4174 PCL: 3969-3979		PCL: 4571-4686	GR/CDL/CNL: 0-5413 DIL/DLL: 514-5413 INT: 3830-5390 PCL: 5100-5392	CDL/CNL: 100-5406 DIL/DLL: 501-5424 GD: 460-5440 INT: 502-5923	CDL/CNL: 0-4496 DIL/DLL: 551-4514 PCL: 5100-5424 INT: 3770-4010
TULLY LIMESTONE	2556-	2578-	2403-	2662-	2448-	2551-	3080-	3552-	3536-	3554-
ONONDAGA LIMESTONE HUNTERSVILLE CHERT	2785-	2800-	2620-	2886-	2658-	2773-	3310-	3776-	3756-	3770-
ORISKANY SANDSTONE RIDGELEY SANDSTONE			2868-					3930-	3908-	3926-
SILURIAN-DEVONIAN CARBONATES								3953-	3933-	3954-
SALINA GROUP LOCKPORT DOLOMITE								4030- 4752-	4014- 4736-	4038-
ROCHESTER SHALE IRONDEQUOIT DOLOMITE	3945-	3910- 3994-	3804- 3858-	3980- 4048-	3814- 3868-	3850- 3944-	4420- 4476-	5022- 5086-	5020- 5084-	5132-
GRIMSBY FORMATION CABOT HEAD SHALE WHIRLPOOL SANDSTONE	3980- 4108- 4148-	4072- 4157- 4203-	3882- 4024- 4063-	4070- 4205- 4250-	3890- 4028- 4072-	4004- 4089- 4138-	4560- 4622- 4680-	5146- 5274- 5312-	5140- 5246- 5306-	5228- 5342- 5360-
QUEENSTON FORMATION	4158-	4213-	4072-	4260-	4080-	4150-	4690-	5324-	5320-	5372-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	4032-4064	4075-4207	3920-4066	4128-4203	3969-3979	4047-4146	4571-4686	5179-5271	5186-5257	5232-5315
TOTAL DEPTH	4280	4303	4164	4358	4174	4245	4791	5430	5455	5434
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	800 Mcf AF 1,100 psi/48 hrs. development Rockdale field	119 Mcf AF 1,060 psi/168 hrs. development Rockdale field	60 Mcf AF 1,000 psi/168 hrs. development Cambridge Springs field	60 Mcf AF 1,150 psi/168 hrs. development Rockdale field	237 Mcf AF 1,150 psi/168 hrs. development Cambridge Springs field	5,106 Mcf AF 1,240 psi/168 hrs. development Rockdale field	84 Mcf AF 1,275 psi/168 hrs. development Rockdale field	1,450 Mcf AF 1,325 psi/168 hrs. development Wilson Mills pool Lake Creek field	189 Mcf AF 1,375 psi/72 hrs. Deeper pool test Motters pool Black Ash field	1,850 Mcf AF 1,450 psi/72 hrs. development Wilson Mills pool Lake Creek field

COUNTY Permit Number	Crawford 039-22692	Crawford 039-22693	Crawford 039-22800	Crawford 039-22801	Crawford 039-22809	Crawford 039-22810	Crawford 039-22811	Crawford 039-22812	Crawford 039-22814	Crawford 039-22815
NAME OF WELL	Andrew Kuzman #1	Ronald Kerr #1	C. & N. Collins #1	M. Caldwell #1	Simon Lee #1	Carl H. Patterson #1	Darrel L. Schweitzer #1	Harry E. Firth #1	Arthur Burleigh #5	Arthur Burleigh #6
OPERATOR	Troyer Gas & Dill #T-29	Quaker State Dill Refining Corp.	Mark Resources Corporation	Mark Resources Corporation	Diasu Exploration & Production #DS-10	Diasu Exploration & Production #DS-8	Diasu Exploration & Production #DS-4	Diasu Exploration & Production #DS-7	Doran & Associates, Inc. #K-P-98	Doran & Associates, Inc. #K-P-99
TOWNSHIP	Rockdale	Dill Creek	Wayne	Troy	Rome	Sparta	Sparta	Sparta	Rome	Rome
QUADRANGLE	Millers Station	Titusville North	Sugar Lake	Dempseytown	Titusville North	Spartansburg	Spartansburg	Spartansburg	Grand Valley	Grand Valley
LATITUDE	11,300 ft. S 41°52'30"	11,200 ft. S 41°42'30"	8,050 ft. S 41°35'00"	14,700 ft. S 41°37'30"	10,170 ft. S 41°45'00"	12,620 ft. S 41°50'00"	10,835 ft. S 41°50'00"	2,875 ft. S 41°47'30"	13,100 ft. S 41°45'00"	14,150 ft. S 41°45'00"
LONGITUDE	7,600 ft. W 79°57'30"	50 ft. W 79°37'30"	4,250 ft. W 79°55'00"	9,600 ft. W 79°50'00"	4,660 ft. W 79°42'30"	3,080 ft. W 79°42'30"	11,220 ft. W 79°42'30"	8,480 ft. W 79°42'30"	10,750 ft. W 79°35'00"	9,800 ft. W 79°35'00"
DATE COMPLETED	2-17-86	11-24-86	3-8-86	3-22-86	10-29-86	12-28-86	12-5-86	9-22-86	7-15-86	7-22-86
ELEVATION	1190 GR	1610 GR	1427 GR	1326 GR	1570 GR	1598 GR	1515 GR	1375 GR	1660 GR	1570 GR
LOGS RECEIVED AND LOGGED INTERVALS	PCL: 3800-4152		CDL/CNL: 0-5292 INT: 700-5250 PCL: 4960-5265	CDL/CNL: 50-5285 DIL/GR: 550-5291 GR/SPECTAL: 550-5291 INT: 550-5275	CDL/CNL: 3400-5277	CDL/CNL: 3200-5062	CDL/CNL: 3100-4902	CDL/CNL: 3000-4875	CDL/CNL: 0-5542 DIL/GR: 844-5560 INT: 0-5542 INT: 3855-4139	CDL/CNL: 0-5543 DIL/GR: 840-5463 INT: 0-5463
TULLY LIMESTONE	2490-	3743-	3448-	3418-	3450-	3274-	3148-	3074-	3690-	3614-
ONONDAGA LIMESTONE HUNTERSVILLE CHERT	2712-	4014-	3660-	3640-	3692-	3518-	3388-	3312-	3956-	3880-
ORISKANY SANDSTONE RIDGELEY SANDSTONE		4113- Bois Blanc	3815-	3786-					4100-	4020-
SILURIAN-DEVONIAN CARBONATES	2905-	4158-	3837-	3812-	3852-	3684-	3558-	3474-	4133-	4057-
SALINA GROUP LOCKPORT DOLOMITE	3012- 3564-	4280- 4914-	3930- 4610-	3896- 4640-	3920- 4582-	3746- 4368-	3616- 4237-	3536- 4176-	4164- 4820-	4084- 4746-
ROCHESTER SHALE IRONDEQUOIT DOLOMITE	3812- 3890-	5137- 5274-	4932- 4992-	4917- 4980-	4864- 4924-	4646- 4695-	4506- 4568-	4468- 4510-	5102- 5170-	5036- 5102-
GRIMSBY FORMATION CARBOT HEAD SHALE WHIRLPOOL SANDSTONE	3924- 4050- 4094-	5328- 5459- 5490-	5022- 5186- 5217-	5038- 5160- 5200-	4976- 5100- 5134-	4794- 4864- 4902-	4614- 4718- 4772-	4558- 4680- 4716-	5228- 5337- 5382-	5150- 5269- 5314-
QUEENSTON FORMATION	4110-	5500-	5232-	5214-	5154-	4914-	4782-	4731-	5395-	5326-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	3983-4022	5366-5499	5106-5162	5082-5127	5010-5152	4789-4911	4644-4776	4592-4728	5225-5393	5170-5324
TOTAL DEPTH	4227	5666	5310	5302	5277	5062	4902	4874	5575	5499
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	2,000 Mcf AF 1,150 psi/144 hrs. development Rockdale field	1,500 Mcf AF 1,295 psi/48 hrs. development Porky Run pool Dotyville field	148 Mcf AF 1,175 psi/72 hrs. development Wilson Mills pool Lake Creek field	1,870 Mcf AF 1,315 psi/72 hrs. development Wilson Mills pool Lake Creek field	2,217 Mcf AF 1,275 psi/72 hrs. development Rome pool Athens field	1,875 Mcf AF 1,200 psi/72 hrs. development Brimstone pool Athens field	1,700 Mcf AF 1,275 psi/72 hrs. development Brimstone pool Athens field	1,700 Mcf AF 1,275 psi/72 hrs. development Brimstone pool Athens field	170 Mcf AF 1,265 psi/72 hrs. development Vrooman pool Church Run field	1,050 Mcf AF 1,374 psi/72 hrs. development Vrooman pool Church Run field

Figure 36. (Continued).

COUNTY Permit Number	Crawford 039-22816	Crawford 039-22819	Crawford 039-22820	Crawford 039-22828	Crawford 039-22829	Crawford 039-22830	Crawford 039-22832	Crawford 039-22833	Crawford 039-22834	Crawford 039-22835
NAME OF WELL	Bly-Reynolds #1	R. Laubscher #1	Norman Money #1	Albert Brenner #1	Regis Nadojny #1	Andrew B. Byler #1	Clifford Barrett #1	Willey Unit #2	Gage #3	Zilhaber #3
OPERATOR	Mark Resources Corporation	Oran & Associates, Inc. #K-P-100	Commodore Energy Company	Diasu Exploration & Production #05-21	Diasu Exploration & Production #05-39	Diasu Exploration & Production #05-25	Meridian Exploration #177	Meridian Exploration #397	Meridian Exploration #054	Meridian Exploration #364
TOWNSHIP	Troy	Dill Creek	Conneaut	Sparta	Rome	Sparta	Rockdale	Bloomfield	Cambridge	Rockdale
QUADRANGLE	Oempseytown	Grand Valley	Lineaville	Spartanburg	Spartanburg	Lake Canadonha	Millers Station	Millers Station	Cambridge Springs	Cambridge Springs
LATITUDE	13,450 ft. S 41°37'30"	13,300 ft. S 41°42'30"	10,000 ft. S 41°22'30"	5,900 ft. S 41°47'30"	15,065 ft. S 41°47'30"	10,620 ft. S 41°50'00"	1,400 ft. S 41°50'00"	14,980 ft. S 41°52'30"	2,250 ft. S 41°50'00"	5,050 ft. S 41°50'00"
LONGITUDE	7,000 ft. W 79°50'00"	9,700 ft. W 79°35'00"	10,000 ft. W 80°22'30"	6,800 ft. W 79°40'00"	15 ft. W 79°37'30"	5,270 ft. W 79°45'00"	2,300 ft. W 79°57'30"	7,820 ft. W 79°52'30"	5,500 ft. W 80°00'00"	2,940 ft. W 80°00'00"
DATE COMPLETED	6-24-86	7-31-86	12-14-86	8-2-86	8-17-86	7-27-86	8-30-86	8-22-86	9-12-86	9-19-86
ELEVATION	1268 GR	1525 GR	1180 GR	1520 GR	1665 GR	1555 GR	1280 GR	1654 GR	1340 GR	1360 GR
LOGS RECEIVED AND LOGGED INTERVALS	GR/CNL: 10-4101 GR/GO: 510-4101 PCL: 5026-5094	COL/CNL: 0-5580 OLL/GR: 793-5580 INT: 0-5580	COL/GR: 2175-4183 OLL/GR: 2175-4201	COL/CNL: 3250-5104	CDL/CNL: 0-5395	CDL/CNL: 3100-4972	COL/CNL: 413-4315 DIL/LL: 413-4313 INT: 3840-4315 PCL: 4106-4168	COL/CNL: 428-4353 DIL/OLL: 428-4355 PCL: 4167-4283 INT: 4105-4290		COL/CNL: 416-4394 DIL/OLL: 416-4394 PCL: 4160-4319 INT: 4130-4330
TULLY LIMESTONE	3382-	3664-	2459-	3316-	3580-	3153-	2626-	3041-	2645-	2596-
ONONDAGA LIMESTONE HUNTERSVILLE CHERT	3610-	3936-	2610-	3557-	3838-	3392-	2848-	3270-	2867-	2914-
ORISKANY SANDSTONE RIDGELEY SANDSTONE	3755-	4065-	2804-							
SILURIAN-DEVONIAN CARBONATES	3780-	4127-	2812-	3714-	3976-	3564-	3036-	3454-	3069-	3104-
SALINA GROUP LOCKPORT DOLOMITE	3d64-	4156- 4840-	2890- 3597-	3770- 4412-	4042- 4704-	3622- 4232-	3096- 3692-	3565- 4092-	3136- 3748-	3173- 3778-
ROCHESTER SHALE IRONDEQUOIT DOLOMITE		5134- 5200-	3854- 3907-	4680- 4746-	4996- 5050-	4500- 4558-	3062- 4018-	4350- 4434-	3992- 4074-	4046- 4100-
GRIMSBY FORMATION CABOT HEAD SHALE WHIRLPOOL SANDSTONE	4984- 5110- 5152-	5246- 5383- 5418-	3948- 4055- 4124-	4702- 4920- 4958-	5098- 5216- 5262-	4612- 4728- 4776-	4042- 4176- 4218-	4498- 4598- 4635-	4097- 4232- 4276-	4137- 4271- 4308-
QUEENSTON FORMATION	5164-	5429-	4132-	4974-	5273-	4792-	4232-	4648-	4286-	4325-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	5026-5094	5305-5423	3993-4039	4845-4969	5149-5267	4653-4787	4106-4172	4512-4642	4167-4283	4180-4319
TOTAL DEPTH	5242	5616	4233	5104	5395	4973	4325	4732	4379	4410
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	600 Mcf AF 1,450 psi/72 hrs. Wilson Mills Lake Creek field	225 Mcf AF 1,354 psi/72 hrs. Porky Run pool Ootyville field	230 Mcf AF 1,000 psi/72 hrs. development Blood Conneaut field	3,176 Mcf AF 1,150 psi/72 hrs. development Rome pool Athens field	9,527 Mcf AF 1,350 psi/72 hrs. development Hatchtown pool Church Run field	1,704 Mcf AF 1,300 psi/120 hrs. development Ouch Hill pool Athens field	1,517 Mcf AF 1,100 psi/168 hrs. development Rockdale field	237 Mcf AF 1,150 psi/168 hrs. development Rockdale field	237 Mcf AF 1,050 psi/168 hrs. development Rockdale field	119 Mcf AF 1,100 psi/168 hrs. development Rockdale field

COUNTY Permit Number	Crawford 039-22836	Crawford 039-22837	Crawford 039-22838	Crawford 039-22839	Crawford 039-22840	Crawford 039-22841	Crawford 039-22842	Crawford 039-22843	Crawford 039-22844	Crawford 039-22845
NAME OF WELL	Hays Unit #1	Burleigh/Hill #2	Edward Lemke #1	L. Vobrak #1	Gillette Unit #1	Oliszewski #1	Howard Burleigh #1	K. & C. Clark #1	Russell Hummer #1	Michael Eckstein #1
OPERATOR	Comodore Energy Company	Doran & Associates, Inc. WA-F-101	Troyer Gas & Oil #1-34	PACO, Incorporated	Comodore Energy Company	Meridian Exploration #053	Diasu Exploration & Production #08-32	Mark Resources Corporation	Diasu Exploration & Production #08-38	Troyer Gas & Oil #1-37
TOWNSHIP	Conneaut	Oil Creek	Rockdale	Beaver	Conneaut	Cambridge	Rome	Troy	Rome	Rockdale
QUADRANGLE	Linesville	Grand Valley	Millers Station	Beaver Center	Linesville	Cambridge Springs	Grand Valley	Ompseystown	Titusville North	Millers Station
LATITUDE	10,000 ft. S 41°42'30"	8,670 ft. S 41°40'00"	200 ft. S 41°50'00"	1,880 ft. S 41°50'00"	10,160 ft. S 41°42'30"	9,275 ft. S 41°50'00"	5,800 ft. S 41°45'00"	14,600 ft. S 41°37'30"	15,850 ft. S 41°45'00"	1,000 ft. S 41°50'00"
LONGITUDE	5,500 ft. W 80°22'30"	10,210 ft. W 79°35'00"	6,000 ft. W 79°57'30"	4,700 ft. W 80°27'30"	1,580 ft. W 80°25'00"	9,860 ft. W 80°02'30"	9,150 ft. W 79°35'00"	8,000 ft. W 79°50'00"	5,620 ft. W 79°37'30"	10,700 ft. W 79°57'30"
DATE COMPLETED	12-20-86	8-17-86	9-15-86	9-30-86	12-29-86	10-19-86	8-10-86	8-26-86	9-16-86	9-19-86
ELEVATION	1270 GR	1285 GR	1200 GR	951 GR	1090 GR	1142 GR	1702 GR	1265 GR	1591 GR	1330 GR
LOGS RECEIVED AND LOGGED INTERVALS	CDL/GR: 2300-4331 OLL/GR: 2300-4331 INT: 3800-5300	CDL/CNL: 0-5404 DLL/GR: 808-5422 INT: 3800-5300	CDL: 350-4230	CDL/CNL: 0-3697	CDL/GR: 2000-4000 DLL/GR: 2000-4000 PCL: 3860-4061	CDL/CNL: 409-4135 DLL/OLL: 409-4137 PCL: 3800-4100 INT: 3855-4139	CDL/CNL: 3650-5538	GR/CDL/CNL: 0-5242 DLL/GR: 0-5242 INT: 0-5242 PCL: 4900-5176	CDL/CNL: 3550-5405	CDL: 420-2600 PCL: 3900-4282
TULLY LIMESTONE	2550-	3520-	2520-	1972-	2358-	2410-	3706-	3370-	3626-	2656-
ONONDAGA LIMESTONE HUNTERSVILLE CHERT	2704-	3794-	2742-	2124-	2508-	2617-	3962-	3598-	3890-	2676-
ORISKANY SANDSTONE RIDGELEY SANDSTONE	2903-	3914-		2392-	2708-		4115-	3740-		
SILURIAN-DEVONIAN CARBONATES	2910-	3980-	2930-	2398-	2716-	2812-	4125-	3766-	4042-	3068-
SALINA GROUP LOCKPORT DOLOMITE	2988- 3696-	4010- 4704-	3088- 3574-	2476- 3032-	2790- 3496-	2880- 3498-	4186- 4836-	3853- 4590-	4114- 4770-	3126- 3722-
ROCHESTER SHALE IRONDEQUOIT DOLOMITE	3958- 4012-	4889- 5062-	3859- 3915-	3286- 3338-	3757- 3810-	3772- 3828-	5123- 5183-	4868- 4932-	5054- 5118-	3992- 4048-
GRIMSBY FORMATION CABOT HEAD SHALE WHIRLPOOL SANDSTONE	4054- 4162- 4228-	5110- 5237- 5280-	3951- 4080- 4117-	3378- 3483- 3541-	3849- 3980- 4024-	3865- 3993- 4038-	5226- 5352- 5391-	4900- 5096- 5154-	5170- 5204- 5330-	4070- 4199- 4250-
QUEENSTON FORMATION	4235-	5287-	4130-	3553-	4031-	4046-	5407-	5167-	5342-	4261-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	4092-4144	5139-5285	3993-4075	3411-3549	3887-3940	3925-3985	5274-5404	5034-5090	5207-5340	4152-4184
TOTAL DEPTH	4393	5476	4251	3700	4131	4153	5538	5250	5405	4379
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	185 Mcf AF 850 psi/168 hrs. development Blood Conneaut field	340 Mcf AF 1,372 psi/72 hrs. development Bates Run pool Church Run field	1,500 Mcf AF 1,100 psi/240 hrs. development Rockdale field	60 Mcf AF 1,040 psi/72 hrs. development Mud Run pool Conneaut field	195 Mcf AF 1,150 psi/168 hrs. development Blood Conneaut field	474 Mcf AF 1,150 psi/168 hrs. development Cambridge Springs field	3,400 Mcf AF 1,300 psi/120 hrs. development Vrooman pool Church Run field	200 Mcf AF 1,475 psi/72 hrs. development Wilson Mills pool Lake Creek field	2,900 Mcf AF 1,250 psi/72 hrs. development Vrooman pool Church Run field	1,100 Mcf AF 1,100 psi/240 hrs. development Rockdale field

Figure 36. (Continued).

COUNTY Permit Number	Crawford 039-22846	Crawford 039-22847	Crawford 039-22848	Crawford 039-22849	Crawford 039-22850	Crawford McIver-McLevy #1	Crawford 039-22852	Crawford 039-22853	Crawford 039-22855	Crawford 039-22856
NAME OF WELL	R. F. Bayles #2	R. F. Bayles #1	Jack H. Young #1	Richard McCoy #1	Willis-Tracy #1	Mark Resources Corporation	James Salmon #1	Robert James #1	Leroy Glover #2	Field #1
OPERATOR	PACO, Incorporated	PACO, Incorporated	Troyer Gas & Oil Company #1-36	Olasu Exploration & Production #05-14	Mark Resources Corporation	Mark Resources Corporation	Meridian Exploration #180	Meridian Exploration #055	Meridian Exploration #176	Planigan & Associates
TOWNSHIP	Beaver	Beaver	Rockdale	Centerville	Troy	Troy	Rockdale	Bloomfield	Bloomfield	Spring
QUADRANGLE	Beaver Center	Beaver Center	Cambridge Springs	Centerville	Dempseytown	Dempseytown	Millers Station	Lake Canadohta	Millers Station	Conneautville
LATITUDE	3,230 ft. S 41°50'00"	3,250 ft. S 41°50'00"	7,750 ft. S 41°50'00"	2,100 ft. S 41°45'00"	5,100 ft. S 41°37'30"	8,750 ft. S 41°37'30"	650 ft. S 41°50'00"	3,690 ft. S 41°50'00"	2,520 ft. S 41°50'00"	15,250 ft. S 41°50'00"
LONGITUDE	3,580 ft. W 80°27'30"	5,250 ft. W 80°27'30"	1,000 ft. W 80°00'00"	390 ft. W 79°45'00"	7,400 ft. W 79°50'00"	5,750 ft. W 79°50'00"	10,680 ft. W 79°52'30"	8,210 ft. W 79°50'00"	3,125 ft. W 79°50'00"	3,800 ft. W 80°17'30"
DATE COMPLETED	10-6-86	9-22-86	9-25-86	9-1-86	9-25-86	9-16-86	10-29-86	9-30-86	9-25-86	9-28-86
ELEVATION	990 GR	991 GR	1270 GR	1315 GR	1460 GR	1286 GR	1580 GR	1555 GR	1662 GR	1190 GR
LOGS RECEIVED AND LOGGED INTERVALS	CDL/CNL: 1-3665 OLL/GR: 428-3683	CDL/CNL: 0-3772 OLL/GR: 424-3772	GR/COL: 350-4365 PCL/GR: 4000-4348	CDL/CNL: 611-3100	GR/COL/CNL: 0-5366 DLL/GR: 0-5366 INT: 650-5327 PCL: 5100-5281	GR/COL/CNL: 0-5170 OLL/GR: 0-4341 INT: 3600-3850 PCL: 4900-5167	COL/CNL: 427-4649 OLL/LL: 427-4651 INT: 475-515 PCL: 4461-4503			
TULLY LIMESTONE	1958-	1962-	2648-	3126-	3498-	3360-	2962-	3014-	3092-	
ONONDAGA LIMESTONE HUNTERSVILLE CHERT	2118-	2120-	2866-	3368-	3724-	3590-	3188-	3243-	3320-	2474-
ORISKANY SANDSTONE RIDGELEY SANDSTONE	2362-	2376-		3534-	3877-	3740-				2681-
SILURIAN-DEVONIAN CARBONATES	2379-	2384-	3050-	3540-	3898-	3766-	3370-	3420-	3506-	2687-
SALINA GROUP LOCKPORT DOLOMITE	2459- 3042-	2460- 3034-	3120- 3800-	3604- 4214-	3974- 4692-	3846- 4554-	3428- 4025-	3540- 4044-	3616- 4143-	2982- 3430-
ROCHESTER SHALE IRONDEQUOIT DOLOMITE	3284- 3336-	3286- 3338-	3994- 4050-	4492- 4554-	4978- 5038-	4840- 4906-	4280- 4350-	4330- 4413-	4430- 4490-	3735-
GRIMSBY FORMATION CABOT HEAD SHALE WHIRLPOOL SANDSTONE	3376- 3486- 3543-	3377- 3492- 3545-	4092- 4216- 4258-	4610- 4732- 4764-	5095- 5222- 5262-	4980- 5074- 5126-	4388- 4506- 4553-	4480- 4574- 4620-	4565- 4652- 4692-	3808- 3860- 3879-
QUEENSTON FORMATION	3552-	3554-	4269-	4780-	5272-	5139-	4567-	4628-	4708-	3906-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	3419-3448	3418-3551	4130-4207	4645-4778	5134-5216	5001-5070	4461-4503	4483-4569	4601-4702	3822-3894
TOTAL DEPTH	3700	3800	4375	4895	5370	5240	4659	4732	4792	4010
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	100 Mcf AF 1,140 psi/72 hrs. development Mud Run Conneaut field	600 Mcf AF 1,050 psi/72 hrs. development Mud Run Conneaut field	1,000 Mcf AF 1,100 psi/216 hrs. development Rockdale field	1,650 Mcf AF 1,350 psi/96 hrs. development Athens field	300 Mcf AF 1,450 psi/72 hrs. development Crawther pool Fauntetown field	110 Mcf AF 1,425 psi/72 hrs. development Crawther pool Fauntetown field	348 Mcf AF 1,150 psi/168 hrs. development Rockdale field	220 Mcf AF 1,250 psi/168 hrs. development Dutch Hill pool Abbas field	270 Mcf AF 1,000 psi/168 hrs. development Rockdale field	100 Mcf AF 800 psi/48 hrs. development Indian Springs pool Conneaut field

COUNTY Permit Number	Crawford 039-22857	Crawford 039-22858	Crawford 039-22859	Crawford 039-22860	Crawford 039-22861	Crawford 039-22862	Crawford 039-22863	Crawford 039-22864	Crawford 039-22865	Crawford 039-22866
NAME OF WELL	R. L. Byler #1	B. Vroman #1	Manlon Hostetler #1	Leroy Glover #3	J. Goodwill #1	Raymond Foley #1	Basill Hummer #1	Robert McCann #1	Charles Knapp #1	Robert Harrison #1
OPERATOR	Olasu Exploration & Production #03-28	Quaker State Oil Refining Corp.	Olasu Exploration & Production #03-30	Meridian Exploration #204	Quaker State Oil Refining Corp.	Olasu Exploration & Production #03-29	Olasu Exploration & Production #03-40	Olasu Exploration & Production #03-27	Olasu Exploration & Production #03-36	Meridian Exploration #198
TOWNSHIP	Sparta	Rome	Rome	Bloomfield	Oil Creek	Rome	Rome	Sparta	Oil Creek	Bloomfield
QUADRANGLE	Spartansburg	Grand Valley	Titusville North	Millers Station	Titusville North	Spartansburg	Titusville North	Spartansburg	Titusville North	Lake Canadonta
LATITUDE	6,335 ft. S 41°47'30"	4,550 ft. S 41°45'00"	1,365 ft. S 41°45'00"	2,990 ft. S 41°50'00"	1,480 ft. S 41°40'00"	12,545 ft. S 41°47'30"	1,530 ft. S 41°42'30"	1,095 ft. S 41°47'30"	6,270 ft. S 41°42'30"	1,900 ft. S 41°50'00"
LONGITUDE	3,000 ft. W 79°40'00"	8,260 ft. W 79°35'00"	3,210 ft. W 79°37'30"	4,660 ft. W 79°52'30"	8,980 ft. W 79°37'30"	25 ft. W 79°37'30"	2,820 ft. W 79°37'30"	9,200 ft. W 79°42'30"	4,330 ft. W 79°40'00"	8,530 ft. W 79°50'00"
DATE COMPLETED	9-28-86	11-17-86	11-4-86	12-19-86	12-3-86	10-17-86	10-11-86	10-25-86	1-2-87	12-10-86
ELEVATION	1500 GR	1680 GR	1661 GR	1690 GR	1550 GR	1723 GR	1511 GR	1424 GR	1632 GR	1625 GR
LOGS RECEIVED AND LOGGED INTERVALS	COL/CNL: 3250-5081		COL/CNL: 3550-5401			COL/CNL: 3550-5421	COL/CNL: 3500-5395	COL/CNL: 3050-4972	COL/CNL: 0-5413	
TULLY LIMESTONE	3304-	3664-	3584-	3108-	3700-	3616-	3560-	3106-	3674-	3076-
ONONDAGA LIMESTONE HUNTERSVILLE CHERT	3552-	3928-	3846-	3332-	3966-	3876-	3824-	3342-	3930-	3306-
ORISKANY SANDSTONE RIDGELEY SANDSTONE			3984-	3485- Bois Blanc	4078- Bois Blanc				4068-	3459- Bois Blanc
SILURIAN-DEVONIAN CARBONATES	3708-	4063-	3992-	3518-	4118-	4020-	3972-	3508-	4082-	3493-
SALINA GROUP LOCKPORT DOLOMITE	3764- 4392-	4180- 4796-	4050- 4700-	3628- 4132-	4240- 4872-	4090- 4739-	4040- 4708-	3568- 4201-	4118- 4808-	3600- 4107-
ROCHESTER SHALE IRONDEQUOIT DOLOMITE	4669- 4724-	5000- 5131-	4083- 5047-	4410- 4490-	5088- 5224-	5010- 5078-	4993- 5054-	4471- 4534-	5104- 5162-	4386- 4475-
GRIMSBY FORMATION CARBOT HEAD SHALE WHIRLPOOL SANDSTONE	4772- 4900- 4930-	5174- 5320- 5348-	5096- 5231- 5264-	4570- 4675- 4700-	5282- 5410- 5443-	5138- 5250- 5290-	5108- 5228- 5270-	4582- 4692- 4740-	5218- 5332- 5378-	4544- 4642- 4678-
QUEENSTON FORMATION	4948-	5356-	5272-	4716-	5455-	5300-	5280-	4755-	5390-	4692-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	4827-4948	5237-5354	5168-5270	4578-4625	5326-5452	5134-5297	5176-5277	4618-4751	5259-5388	4564-4690
TOTAL DEPTH	5081	5452	5401	4815	5567	5421	5395	4872	5526	4790
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	2,900 Mcf AF 1,350 psi/72 hrs. development Hatchtown pool Church Run field	1,250 Mcf AF 1,300 psi/48 hrs. development Three Bridge pool Seikirk field	3,844 Mcf AF 1,275 psi/72 hrs. development Vrooman pool Church Run field	596 Mcf AF 1,300 psi/168 hrs. development Rockdale field	1,200 Mcf AF 1,400 psi/48 hrs. extension Bates Hollow pool Church Run field	1,480 Mcf AF 1,050 psi/72 hrs. development Hatchtown pool Church Run field	1,904 Mcf AF 1,100 psi/72 hrs. development Vrooman pool Church Run field	1,500 Mcf AF 1,350 psi/72 hrs. development Brimstone pool Athens field	1,600 Mcf AF 1,150 psi/72 hrs. development Rome pool Athens field	119 Mcf AF 1,250 psi/168 hrs. development Dutch Hill pool Athens field

Figure 36. (Continued).

COUNTY Permit Number	Crawford 039-22867	Crawford 039-22868	Crawford 039-22869	Crawford 039-22870	Crawford 039-22871	Crawford 039-22872	Crawford 039-22873	Crawford 039-22875	Crawford 039-22876	Crawford 039-22878
NAME OF WELL	Clyde Peters #1	Reed Gage #2	Robert James #1	Louis McKinney #1	Eagle Line Corp. #2	R. L. Byler #2	Alva Rigby #1	McQuire Unit #2	James Stoll #1	R. L. Jones #1
OPERATOR	Meridian Exploration #518	Meridian Exploration #211	Meridian Exploration #199	Quaker State Oil Refining Corp.	Ooran & Associates, Inc. #K-P-105	Blasau Exploration & Production #08-11	Blasau Exploration & Production #08-41	Meridian Exploration #205	Meridian Exploration #209	Meridian Exploration #409
TOWNSHIP	Rockdale	Rockdale	Bloomfield	Dill Creek	Rome	Sparta	Rome	Bloomfield	Rockdale	Rockdale
QUADRANGLE	Millers Station	Cambridge Springs	Lake Canadabta	Titusville North	Titusville North	Spartansburg	Grand Valley	Millers Station	Cambridge Springs	Millers Station
LATITUDE	9,970 ft. S 41°52'30"	12,680 ft. S 41°52'30"	4,495 ft. S 41°50'00"	8,850 ft. S 41°40'00"	2,775 ft. S 41°05'00"	4,840 ft. S 41°47'30"	4,550 ft. S 41°45'00"	1,500 ft. S 41°50'00"	6,335 ft. S 41°50'00"	9,530 ft. S 41°52'30"
LONGITUDE	975 ft. W 79°57'30"	2,760 ft. W 80°00'00"	9,485 ft. W 79°50'00"	3,080 ft. W 79°40'00"	2,110 ft. W 79°37'30"	3,600 ft. W 79°40'00"	10,620 ft. W 79°35'00"	450 ft. W 79°52'30"	5,525 ft. W 80°00'00"	3,190 ft. W 79°57'30"
DATE COMPLETED	12-13-86	12-22-86	12-8-86	3-12-87	11-21-86	10-31-86	10-22-86	12-15-86	11-8-86	11-6-86
ELEVATION	1447 GR	1250 GR	1478 GR	1450 GR	1590 GR	1407 GR	1650 GR	1575 GR	1286 GR	1310 GR
LOGS RECEIVED AND LOGGED INTERVALS	COL/CNL: 424-4432 OIL/DLL: 424-4432 INT: 4030-4214 PCL: 4036-4081	COL/CNL: 416-4270 OIL/DLL: 416-4270 INT: 4029-4082 PCL: 4029-4082				COL/CNL: 3150-4971	COL/CNL: 3550-5427		COL/CNL: 442-4325 DIL/DLL: 442-4322 INT: 4030-4214 PCL: 4036-4081	COL/CNL: 437-4306 OIL/DLL: 437-4305 INT: 4030-4214 PCL: 4036-4081
TULLY LIMESTONE	2756-	2542-	2942-	3635-	3513-	3206-	3610-	3020-	2606-	2610-
ONONDAGA LIMESTONE HUNTERSVILLE CHERT	2980-	2770-	3171-	3902-	3772-	3448-	3872-	3250-	2820-	2830-
ORISKANY SANDSTONE RIDGELEY SANDSTONE	3180-		3320- Bois Blanc	4010- Bois Blanc				3403- Bois Blanc		
SILURIAN-DEVONIAN CARBONATES	3202-	2965-	3350-	4056-	3888-	3606-	4012-	3432-	3008-	3039-
SALINA GROUP LOCKPORT DOLOMITE	3244- 3812-	3028- 3630-	3464- 3970-	4182- 4801-	3979- 4849-	3664- 4292-	4081- 4737-	3544- 4050-	3078- 3698-	3098- 3674-
ROCHESTER SHALE IRONDEQUOIT DOLOMITE	4078- 4134-	3888- 3954-	4240- 4341-	5032- 5173-	4911- 4980-	4574- 4634-	5017- 5080-	4330- 4418-	3964- 4022-	3928- 3996-
GRIMSBY FORMATION CABOT HEAD SHALE WHIRLPOOL SANDSTONE	4171- 4290- 4336-	3988- 4118- 4154-	4416- 4510- 4542-	5233- 5359- 5390-	5027- 5194-	4682- 4808- 4842-	5122- 5262- 5298-	4486- 4586- 4620-	4058- 4184- 4224-	4019- 4162- 4202-
QUEENSTON FORMATION	4346-	4164-	4566-	5401-	5206-	4860-	5307-	4634-	4246-	4210-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	4225-4284	4029-4082	4418-4499	5269-5400	5195-5070	4717-4856	5145-5305	4506-4633	4131-4174	4065-4143
TOTAL DEPTH	4445	4274	4646	5519	5377	4971	5415	4728	4338	4311
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	119 Mcf AF 1,200 psi/168 hrs. development Rockdale field	84 Mcf AF 1,000 psi/168 hrs. development Rockdale field	42 Mcf AF 1,100 psi/168 hrs. development Dutch Hill Athens field	1,100 Mcf AF 1,300 psi/168 hrs. extension Bates Hollow pool Church Run field	380 Mcf AF 1,350 psi/168 hrs. development Vrooman pool Church Run field	2,488 Mcf AF 1,260 psi/168 hrs. development Hatchtown pool Church Run field	3,345 Mcf AF 1,350 psi/168 hrs. development Vrooman pool Church Run field	84 Mcf AF 1,200 psi/168 hrs. development Rockdale field	119 Mcf AF 1,100 psi/168 hrs. development Cambridge Springs field	237 Mcf AF 1,120 psi/168 hrs. development Rockdale field

COUNTY Permit Number	Crawford 039-22879	Crawford 039-22883	Crawford 039-22886	Crawford 039-22888	Crawford 039-22889	Crawford 039-22890	Crawford 039-22892	Crawford 039-22893	Crawford 039-22894	Crawford 039-22896
NAME OF WELL	Richard McClellan #1	Robert Wallace #1	George Hasbrouck #2	Steven Rensma #3	W. J. Hyde #5	V. N. Gingerich #1	Rigas-Crawford #1	McGuire Unit #1	Frederick N. Hall #1	Basil F. Hummer #2
OPERATOR	Meridian Exploration #517	Olasu Exploration & Production #05-42	Olasu Exploration & Production #05-44	Olasu Exploration & Production #05-45	James Drilling Corporation	Olasu Exploration & Production #05-26	Mark Resources Corporation	Meridian Exploration #052	Olasu Exploration & Production #05-31	Olasu Exploration & Production #05-48
TOWNSHIP	Rockdale	Rome	Rome	Rome	Beaver	Sparta	Troy	Bloomfield	Rome	Rome
QUADRANGLE	Millers Station	Titusville North	Titusville North	Grand Valley	Beaver Center	Lake Canadasha	Centerville	Millers Station	Spartansburg	Titusville North
LATITUDE	15,020 ft. S 41°52'30"	4,440 ft. S 41°45'00"	14,040 ft. S 41°45'00"	1,450 ft. S 41°45'00"	12,130 ft. S 41°50'00"	12,010 ft. S 41°50'00"	13,800 ft. S 41°40'00"	4,550 ft. S 41°50'00"	13,620 ft. S 41°47'30"	825 ft. S 41°42'30"
LONGITUDE	3,400 ft. W 79°57'30"	700 ft. W 79°37'30"	4,220 ft. W 79°37'30"	10,280 ft. W 79°35'00"	9,375 ft. W 80°22'30"	1,900 ft. W 79°45'00"	6,050 ft. W 79°50'00"	1,480 ft. W 79°52'30"	405 ft. W 79°40'00"	440 ft. W 79°37'30"
DATE COMPLETED	11-14-86	1-18-87	12-17-86	1-26-87	12-16-86	6-4-87	1-16-87	2-2-87	2-2-87	2-28-87
ELEVATION	1220 GR	1632 GR	1577 GR	1493 GR	1036 GR	1507 GR	1377 GR	1612 GR	1747 GR	1522 GR
LOGS RECEIVED AND LOGGED INTERVALS	COL/CNL: 427-4238 OIL/LL: 427-4239 INT: 3980-4166 PCL: 4036-4081	COL/CNL: 3550-5402 PCL: 4200-5337	COL/CNL: 3550-5426	COL/CNL: 3500-5368 PCL: 3900-5302	COL/CNL: 250-3717 GO: 3450-3699	COL/CNL: 3100-4908	COL/CNL: 0-5198	COL/CNL: 3600-5436 PCL: 4150-5374	COL/CNL: 3600-5436 PCL: 4150-5374	COL/CNL: 3550-5436
TULLY LIMESTONE	2562-	3582-	3605-	3536-		3140-	3384-	3058-	3636-	3692-
ONONDAGA LIMESTONE HUNTERSVILLE CHERT	2788-	3842-	3870-	3796-	2224-	3378-	3608-	3284-	3684-	3850-
ORISKANY SANDSTONE RIDGELEY SANDSTONE		3988-	4012-	3936-	2465-		3760-			3988-
SILURIAN-DEVONIAN CARBONATES	2978-	3996-	4024-	3944-	2472-	3550-	3782-	3468-	4034-	3996-
SALINA GROUP LOCKPORT DOLOMITE	3038- 3626-	4062- 4702-	4094- 4744-	4002- 4660-	2552- 3160-	3606- 4224-	3848- 4550-	3578- 4106-	4096- 4720-	4064- 4735-
ROCHESTER SHALE IRONDEQUOT DOLOMITE	3894- 3950-	4988- 5050-	5025- 5084-	4936- 5004-	3440- 3484-	4503- 4554-	4838- 4896-	4365- 4451-	5002- 5068-	5025- 5088-
GRIMSBY FORMATION CAROT HEAD SHALE WHIRLPOOL SANDSTONE	3986- 4118- 4154-	5097- 5222- 5266-	5137- 5259- 5295-	5054- 5186- 5220-	3518- 3606- 3690-	4600- 4714- 4760-	4953- 5076- 5112-	4516- 4620- 4654-	5116- 5230- 5278-	5140- 5270- 5300-
QUEENSTON FORMATION	4164-	5276-	5307-	5232-	3698-	4772-	5124-	4670-	5296-	5311-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	4036-4081	5158-5274	5169-5302	5104-5225	3569-3592	4638-4766	4991-5067	4546-4578	5153-5294	5175-5309
TOTAL DEPTH	4253	5402	5426	5368	3745	4908	5218	4778	5437	5436
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	335 Mcf AF 1,000 psi/168 hrs. development Rockdale field	5,925 Mcf AF 1,200 psi/72 hrs. development Vrooman pool Church Run field	963 Mcf AF 1,200 psi/72 hrs. development Vrooman pool Church Run field	10,282 Mcf AF 1,200 psi/72 hrs. development Vrooman pool Church Run field	272 Mcf AF 1,020 psi/72 hrs. development Indian Springs pool Conneaut field	896 Mcf AF 1,225 psi/72 hrs. development Dutch Hill Athens field	64 Mcf AF 1,425 psi/72 hrs. development Crawther pool Faucettown field	554 Mcf AF 1,100 psi/168 hrs. development Rockdale field	1,521 Mcf AF 1,200 psi/72 hrs. development Hatchtown pool Church Run field	1,025 Mcf AF 1,200 psi/72 hrs. development Vrooman pool Church Run field

Figure 36. (Continued).

COUNTY Permit Number	Crawford 039-22897	James W. Rasey #1	Crawford 039-22898	James R. Byler #1	Crawford 039-22899	Oennis Roth #1	Crawford 039-22901	Alec J. Shuda #1	Crawford 039-22902	Robert Wallace #2	Crawford 039-22904	Simon O. Lee #2	Olasu Exploration & Production #03-51	Daniel McCombs #2	Crawford 039-22907	Albert Brenner #2	Crawford 039-22909	Howard Burleigh #2	Crawford 039-22912	Mahlon J. Troyer #1
NAME OF WELL	Olasu Exploration & Production #03-23	Olasu Exploration & Production #03-46	Olasu Exploration & Production #03-22	Olasu Exploration & Production #03-34	Olasu Exploration & Production #03-50	Olasu Exploration & Production #03-53	Olasu Exploration & Production #03-51	Olasu Exploration & Production #03-50	Olasu Exploration & Production #03-53	Olasu Exploration & Production #03-50	Olasu Exploration & Production #03-53	Olasu Exploration & Production #03-51	Olasu Exploration & Production #03-58	Olasu Exploration & Production #03-51	Olasu Exploration & Production #03-58	Olasu Exploration & Production #03-54	Olasu Exploration & Production #03-54	Olasu Exploration & Production #03-54	Olasu Exploration & Production #03-52	Olasu Exploration & Production #03-52
TOWNSHIP	Sparta	Sparta	Sparta	Sparta	Sparta	Sparta	Sparta	Sparta	Sparta	Sparta	Sparta	Sparta	Sparta	Sparta	Sparta	Sparta	Sparta	Sparta	Sparta	Sparta
QUADRANGLE	Spartansburg	Spartansburg	Spartansburg	Spartansburg	Spartansburg	Spartansburg	Spartansburg	Spartansburg	Spartansburg	Spartansburg	Spartansburg	Spartansburg	Spartansburg	Spartansburg	Spartansburg	Spartansburg	Spartansburg	Spartansburg	Spartansburg	Spartansburg
LATITUDE	4,290 ft. S 41°47'30"	13,935 ft. S 41°50'00"	4,500 ft. S 41°47'30"	7,930 ft. S 41°45'00"	4,470 ft. S 41°45'00"	9,220 ft. S 41°45'00"	3,400 ft. S 41°45'00"	4,570 ft. S 41°45'00"	4,470 ft. S 41°45'00"	9,220 ft. S 41°45'00"	9,220 ft. S 41°45'00"	9,220 ft. S 41°45'00"	3,400 ft. S 41°45'00"	3,400 ft. S 41°45'00"	4,570 ft. S 41°47'30"	3,970 ft. S 41°45'00"	3,970 ft. S 41°45'00"	3,970 ft. S 41°45'00"	3,970 ft. S 41°47'30"	12,120 ft. S 41°47'30"
LONGITUDE	7,420 ft. W 79°37'30"	2,095 ft. W 79°42'30"	1,980 ft. W 79°40'00"	7,580 ft. W 79°42'30"	2,570 ft. W 79°37'30"	5,380 ft. W 79°42'30"	8,070 ft. W 79°42'30"	6,490 ft. W 79°40'00"	9,450 ft. W 79°37'30"	5,380 ft. W 79°42'30"	5,380 ft. W 79°42'30"	5,380 ft. W 79°42'30"	8,070 ft. W 79°42'30"	8,070 ft. W 79°42'30"	6,490 ft. W 79°40'00"	9,450 ft. W 79°35'00"	9,450 ft. W 79°35'00"	9,450 ft. W 79°35'00"	9,450 ft. W 79°37'30"	3,030 ft. W 79°37'30"
DATE COMPLETED	3-28-87	9-13-87	2-21-87	3-21-87	3-8-87	4-1-87	4-3-87	9-3-87	9-9-87	5-22-87	4-1-87	4-3-87	9-3-87	9-3-87	9-3-87	9-9-87	9-9-87	9-9-87	9-9-87	5-22-87
ELEVATION	1489 GR	1566 GR	1417 GR	1470 GR	1558 GR	1581 GR	1440 GR	1440 GR	1581 GR	1558 GR	1581 GR	1581 GR	1440 GR	1440 GR	1413 GR	1675 GR	1675 GR	1675 GR	1675 GR	1745 GR
LOGS RECEIVED AND LOGGED INTERVALS	COL/CNL: 3250-5090	COL/CNL: 3250-5056	COL/CNL: 3150-5000	COL/CNL: 3300-5148	COL/CNL: 3450-5353	COL/CNL: 3400-5265	COL/CNL: 3250-5095	COL/CNL: 3450-5353	COL/CNL: 3450-5353	COL/CNL: 3450-5353	COL/CNL: 3400-5265	COL/CNL: 3400-5265	COL/CNL: 3250-5095	COL/CNL: 3250-5095	COL/CNL: 0-4965	COL/CNL: 3600-5453	COL/CNL: 3600-5453	COL/CNL: 3600-5453	COL/CNL: 3550-5450	COL/CNL: 3550-5450
TULLY LIMESTONE	3282-	3270-	3216-	3324-	3514-	3446-	3266-	3514-	3514-	3446-	3446-	3446-	3266-	3266-	3188-	3642-	3642-	3642-	3628-	3628-
ONONDAGA LIMESTONE HUNTERSVILLE CHERT	3530-	3512-	3462-	3564-	3770-	3686-	3507-	3770-	3770-	3686-	3686-	3686-	3507-	3507-	3430-	3904-	3904-	3904-	3888-	3888-
ORISKANY SANDSTONE RIDGELEY SANDSTONE				3730-	3918-	3856-		3918-	3918-	3856-	3856-	3856-								
SILURIAN-DEVONIAN CARBONATES	3690-	3676-	3620-	3735-	3926-	3864-	3674-	3926-	3926-	3864-	3864-	3864-	3674-	3674-	3590-	4046-	4046-	4046-	4033-	4033-
SALINA GROUP LOCKPORT DOLOMITE	3760- 4392-	3738- 4366-	3676- 4310-	3804- 4450-	3990- 4620-	3928- 4576-	3740- 4375-	3650- 4280-	3990- 4620-	3928- 4576-	3928- 4576-	3928- 4576-	3650- 4280-	3650- 4280-	3650- 4280-	4120- 4768-	4120- 4768-	4120- 4768-	4094- 4750-	4094- 4750-
ROCHESTER SHALE IRONDEQUOIT DOLOMITE	4670- 4732-	4600- 4698-	4592- 4650-	4728- 4793-	4922- 4986-	4854- 4918-	4656- 4716-	4922- 4986-	4922- 4986-	4854- 4918-	4854- 4918-	4854- 4918-	4656- 4716-	4656- 4716-	4560- 4616-	5050- 5114-	5050- 5114-	5050- 5114-	5034- 5094-	5034- 5094-
GRIMSBY FORMATION CABOT HEAD SHALE WHIRLPOOL SANDSTONE	4784- 4902- 4938-	4746- 4866- 4904-	4703- 4828- 4858-	4848- 4954- 5000-	5035- 5162- 5200-	4970- 5094- 5129-	4766- 4798- 4926-	4664- 4788- 4824-	5035- 5162- 5200-	4970- 5094- 5129-	4970- 5094- 5129-	4970- 5094- 5129-	4766- 4798- 4926-	4766- 4798- 4926-	4664- 4788- 4824-	5160- 5298- 5329-	5160- 5298- 5329-	5160- 5298- 5329-	5144- 5266- 5305-	5144- 5266- 5305-
QUEENSTON FORMATION	4952-	4918-	4874-	5020-	5212-	5149-	4944-	5212-	5212-	5149-	5149-	5149-	4944-	4944-	4839-	5341-	5341-	5341-	5314-	5314-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	4941-4900	4785-4914	4736-4868	4880-5018	5074-5207	5034-5146	4819-4942	4705-4836	5212-5335	5191-5310	5212-5335	5212-5335	4705-4836	4705-4836	4705-4836	5212-5335	5212-5335	5212-5335	5191-5310	5191-5310
TOTAL DEPTH	5090	5056	5000	5148	5346	5265	5095	5148	5346	5265	5265	5265	4964	4964	4964	5453	5453	5453	5450	5450
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	1,303 Mcf AF 1,175 psi/72 hrs. Hatchtown Church Run field	963 Mcf AF 1,200 psi/72 hrs. development Hatchtown field	2,700 Mcf AF 1,200 psi/72 hrs. development Hatchtown field	795 Mcf AF 1,325 psi/72 hrs. development Hatchtown field	4,159 Mcf AF 1,200 psi/72 hrs. development Hatchtown field	2,488 Mcf AF 1,300 psi/72 hrs. development Hatchtown field	2,735 Mcf AF 1,325 psi/72 hrs. development Hatchtown field	1,471 Mcf AF 1,100 psi/72 hrs. development Hatchtown field	3,851 Mcf AF 1,100 psi/72 hrs. development Hatchtown field	1,769 Mcf AF 1,320 psi/72 hrs. development Hatchtown field	1,471 Mcf AF 1,100 psi/72 hrs. development Hatchtown field	2,735 Mcf AF 1,325 psi/72 hrs. development Hatchtown field	1,471 Mcf AF 1,100 psi/72 hrs. development Hatchtown field	3,851 Mcf AF 1,100 psi/72 hrs. development Hatchtown field	1,769 Mcf AF 1,320 psi/72 hrs. development Hatchtown field	1,471 Mcf AF 1,100 psi/72 hrs. development Hatchtown field	3,851 Mcf AF 1,100 psi/72 hrs. development Hatchtown field	1,769 Mcf AF 1,320 psi/72 hrs. development Hatchtown field	1,471 Mcf AF 1,100 psi/72 hrs. development Hatchtown field	

COUNTY Permit Number	Crawford 039-22914	Crawford 039-22915	Crawford 039-22916	Crawford 039-22917	Crawford 039-22919	Crawford 039-22921	Crawford 039-22922	Crawford 039-22923	Crawford 039-22931	Crawford 039-22935
NAME OF WELL	Roland Blakeslee #1	R. & D. Shay #1	George Hasbrouck #3	Donald McCray #1	Mildred Merry #1	Roland Blakeslee #1	Smith-Merry #1	Bly-Armstrong #1	Hasbrouck Sand & Gravel Co. #1	Mildred Doherty #1
OPERATOR	Diasu Exploration & Production #DS-24	Mark Resources Corporation	Diasu Exploration & Production #DS-64	Diasu Exploration & Production #DS-60	Diasu Exploration & Production #DS-63	Diasu Exploration & Production #DS-65	Mark Resources Corporation	Mark Resources Corporation	Walisco Oil & Gas Company #W-221	Diasu Exploration & Production #DS-71
TOWNSHIP	Bloomfield	Wayne	Rome	Sparta	Rome	Bloomfield	Troy	Troy	Bloomfield	Rome
QUADRANGLE	Lake Canadohta	Sugar Lake	Titusville North	Spartansburg	Spartansburg	Lake Canadohta	Dempseytown	Dempseytown	Lake Canadohta	Titusville North
LATITUDE	8,160 ft. S 41°50'00"	9,300 ft. S 41°50'00"	13,590 ft. S 41°45'00"	12,840 ft. S 41°50'00"	12,020 ft. S 41°47'30"	6,810 ft. S 41°50'00"	11,400 ft. S 41°37'30"	3,200 ft. S 41°37'30"	12,130 ft. S 41°50'00"	8,850 ft. S 41°45'00"
LONGITUDE	9,330 ft. W 79°45'00"	9,700 ft. W 79°52'30"	5,685 ft. W 79°37'30"	4,580 ft. W 79°42'30"	6,180 ft. W 79°37'30"	9,340 ft. W 79°45'00"	7,200 ft. W 79°50'00"	6,050 ft. W 79°50'00"	3,120 ft. W 79°47'30"	3,680 ft. W 79°42'30"
DATE COMPLETED	5-29-87	6-16-87	7-2-87	6-11-87	6-18-87	6-26-87	7-31-87	8-24-87	7-19-87	8-7-87
ELEVATION	1458 GR	1579 GR	1605 GR	1565 GR	1760 GR	1490 GR	1283 GR	1314 GR	1395 GR	1550 GR
LOGS RECEIVED AND LOGGED INTERVALS	CDL/CNL: 3000-4773		CDL/CNL: 3550-5464	CDL/CNL: 3200-5000	CDL/CNL: 3600-5423	CDL/CNL: 3000-4803			CDL/GR: 0-4782 LL/GR: 0-4782 INT: 0-4782 PCL: 4100-4702	CDL/CNL: 1893-5243
TULLY LIMESTONE	3030-	3712-	3623-	3246-	3639-	3042-	3358-	3349-	2992-	3416-
ONONDAGA LIMESTONE HUNTERSVILLE CHERT	3268-	3932-	3886-	3486-	3892-	3280-	3584-	3574-	3228-	3660-
ORISKANY SANDSTONE RIDGELEY SANDSTONE		4079-	4032-				3734-	3736-		3830-
SILURIAN-DEVONIAN CARBONATES	3440-	4100-	4041-	3652-	4040-	3453-	3756-	3754-	3400-	3836-
SALINA GROUP LOCKPORT DOLOMITE	3496- 4102-	4250- 4866-	4112- 4716-	3708- 4332-	4104- 4746-	3506- 4112-	3892- 4516-	3878- 4498-	3457- 4076-	3900- 4544-
ROCHESTER SHALE IRONDEQUOIT DOLOMITE	4382- 4433-	5178- 5246-	5040- 5104-	4616- 4664-	5028- 5088-	4396- 4446-	4836- 4902-	4812- 4876-	4357- 4410-	4829- 4890-
GRIMSBY FORMATION CABOT HEAD SHALE WHIRPOOL SANDSTONE	4476- 4601- 4640-	5346- 5430- 5474-	5158- 5282- 5316-	4712- 4834- 4874-	5150- 5260- 5300-	4489- 4610- 4651-	5006- 5040- 5120-	4976- 5030- 5098-	4452- 4571- 4614-	4940- 5059- 5104-
QUEENSTON FORMATION	4655-	5488-	5326-	4884-	5311-	4664-	5134-	5112-	4632-	5120-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	4520-4653	5356-5425	5194-5324	4769-4880	5183-5309	4541-4663	5010-5066	4980-5054	4486-4629	4973-5116
TOTAL DEPTH	4773	5575	5464	5000	5423	4808	5296	5233	4782	5343
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	2,011 Mcf AF 1,100 psi/72 hrs. development Dutch Hill pool Athens field	316 Mcf AF 1,425 psi/72 hrs. development Wilson Mills pool Lake Creek field	1,109 Mcf AF 1,250 psi/72 hrs. development Vrooman pool Church Run field	5,800 Mcf AF 1,225 psi/72 hrs. development Brimstone pool Athens field	1,470 Mcf AF 1,150 psi/72 hrs. development Hatchtown pool Church Run field	4,159 Mcf AF 1,175 psi/72 hrs. development Dutch Hill pool Athens field	113 Mcf AF 1,300 psi/72 hrs. development Wilson Mills pool Lake Creek field	470 Mcf AF 1,485 psi/72 hrs. development Crawther pool Fauncetown field	1,704 Mcf AF 870 psi/72 hrs. development Lincolnville pool field	1,760 Mcf AF 1,220 psi/72 hrs. development Rome pool Athens field

Figure 36. (Continued).

COUNTY Permit Number	Crawford 039-22937	Crawford 039-22943	Erie 049-21148	Erie 049-23677	Erie 049-23852-D	Erie 049-23943	Erie 049-24021	Erie 049-24105	Erie 049-24364	Erie 049-24370
NAME OF WELL	Frederick Hall #2	Frank Kozik #2	R. E. Neher #1	Charles Bowen #1	Stephen Burbules #1	Louis Tracy #3	Donald Kozy #1	Cross #3	Joseph Dverman #1	Carrie Bayhurst #2
OPERATOR	Olasu Exploration & Production #0S-49	Mainco Oil & Gas Company #M-227	PACO, Incorporated	Kaltsas Oil Company, Inc.	Robert H. Brace	Vineyard Oil & Gas Company	Troyer Gas & Oil Company	Richard B. Cross	Vineyard Oil & Gas Company	Vineyard Oil & Gas Company
TOWNSHIP	Rome	Bloomfield	Conneaut	Greenfield	Waterford	Waterford	Waterford	Millcreek	Venango	Greene
QUADRANGLE	Spartansburg	Lake Canadasha	East Springfield	Wattsburg	Cambridge Spgs. NE	Cambridge Spgs. NE	Waterford	Swanville	Wattsburg	Hammett
LATITUDE	13,380 ft. S 41°47'30"	12,020 ft. S 41°50'00"	13,900 ft. S 41°55'00"	10,050 ft. S 42°07'30"	13,350 ft. S 42°00'00"	1,400 ft. S 42°00'00"	7,250 ft. S 42°00'00"	14,750 ft. S 42°07'30"	10,400 ft. S 42°05'00"	6,600 ft. S 42°02'30"
LONGITUDE	10,750 ft. W 79°37'30"	10,580 ft. W 79°45'00"	6,500 ft. W 80°25'00"	700 ft. W 79°50'00"	3,150 ft. W 80°00'00"	11,000 ft. W 80°00'00"	2,480 ft. W 79°57'30"	9,450 ft. W 80°07'30"	10,000 ft. W 79°45'00"	10,500 ft. W 79°57'30"
DATE COMPLETED	8-1-87	7-28-87	9-13-80	5-18-84	8-30-84	6-5-84	8-12-84	4-22-85	2-5-85	1-24-85
ELEVATION	1775 GR	1395 GR	935 GR	1350 GR	1375 GR	1465 GR	1290 GR	731 GR	1670 GR	1300 GR
LOGS RECEIVED AND LOGGED INTERVALS	COL/CNL: 3600-5476	COL/GR: 0-4754 OIL/GR: 514-4776 SOR: 4350-4730 FCL: 4300-4727			COL/GR: 430-2652 GR/IL/T: 2100-3919		COL/GR: 1804-3850 FCL: 3607-3660			COL/CNL: 19-3694 LL/GR: 638-3691
TULLY LIMESTONE	3669-	2996-		2100-	2174-	2212-	2123-	2538-	2014-	
ONONDAGA LIMESTONE HUNTERSVILLE CHERT	3920-	3230-	1942-	2322-	2396-	2436-		2774-	2242-	
ORISKANY SANDSTONE RIDGELEY SANDSTONE			2224-		2642-	2630-	2598-		2490-	
SILURIAN-DEVONIAN CARBONATES	4070-	3402-			2654-		2620-		2510-	
SALINA GROUP LOCKPORT DOLOMITE	4132- 4750-	3462- 4074-	2556- 2835-	2600- 2890-	2790- 3286-		2706- 3208-		3365- 3530-	2596- 3036-
ROCHESTER SHALE IRONDEQUOIT DOLOMITE	5054- 5100-	4352- 4406-	3174-	3250- 3353-	3569- 3618-		3482- 3536-		3794- 3844-	3356- 3406-
GRIMSBY FORMATION CABOT HEAD SHALE WHIRLPOOL SANDSTONE	5154- 5278- 5310-	4450- 4550- 4612-	3207-	3370- 3502- 3532-	3640- 3688- 3814-		3570- 3688- 3728-		3865- 4002- 4026-	3537- 3596- 3604-
QUEENSTON FORMATION	5330-	4628-		3545-	3820-		3737-		4042-	
PRODUCING FORMATION	Medina	Medina		Medina	Medina	Onondaga	Medina	Oriskany	Medina	Medina
PRODUCING INTERVAL	5190-5326	4482-4624		3405-3537	3717-3763	1486-1488	3607-3660	1753-	3905-4039	3452-3590
TOTAL DEPTH	5485	4783	3509	3641	3939	2720	3889	1753?	4145	3695
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Driskany	Queenston	Driskany	Queenston	Queenston
RESULTS	1,243 Mcf AF 1,050 psi/72 hrs. development Hatchtown pool Church Run field	1,873 Mcf AF 800 psi/240 hrs. development Outch Hill pool Athens field	Ory development Bushnell-Lexington pool Conneaut field	100 Mcf AF 1,050 psi/48 hrs. development Little Hope pool North East field	1,500 Mcf AF 1,120 psi/144 hrs. development Oopened 1284 ft. Swails pool Orumlin field	0.03 BBL 200 psi/48 hrs. New pool discovery Sibleyville pool Orumlin field	1,000 Mcf AF 1,100 psi/48 hrs. development Falcott pool Erie field	4,500 Mcf AF 720 psi/48 hrs. development Car Wash pool Erie field	650 Mcf AF 1,050 psi/48 hrs. development Bailey Brook pool North East field	1,200 Mcf AF 900 psi/120 hrs. development Goddard pool Erie field

COUNTY Permit Number	Erie 049-24377	Erie 049-24378	Erie 049-24395-0	Erie 049-24429	Erie 049-24469	Erie 049-24486	Erie 049-24487	Erie 049-24512	Erie 049-24594	Erie 049-24600
NAME OF WELL	Erie Municipal Airport Authority #1	Richard Fiedler #1	James Conny #1	First Assembly of God Church #2	Erie Municipal Airport #4	Kozlowski/Bernard #1	Charles Vicary #1	Harry Winkelman #1	Allice Pasiecznik #1	Joseph Haiml #1
OPERATOR	Vineyard Oil & Gas Company	Vineyard Oil & Gas Company	Robert H. Brace	First Assembly of God Church	Vineyard Oil & Gas Company	Vineyard Oil & Gas Company	Charles Vicary	Vineyard Oil & Gas Company	Robert H. Brace	N.E.A. Cross Company
TOWNSHIP	Millcreek	Waterford	Waterford	Summit	Millcreek	Millcreek	Millcreek	Summit	Waterford	Millcreek
QUADRANGLE	Swanville	Cambridge Spgs. NE	Cambridge Spgs. NE	Erie South	Swanville	Swanville	Swanville	Erie South	Cambridge Spgs. NE	Swanville
LATITUDE	14,150 ft. S 42°07'30"	5,800 ft. S 41°57'30"	10,000 ft. S 42°00'00"	13,200 ft. S 42°05'00"	2,600 ft. S 42°05'00"	14,800 ft. S 42°07'30"	15,000 ft. S 42°07'30"	11,500 ft. S 42°02'30"	1,700 ft. S 42°00'00"	2,000 ft. S 42°05'00"
LONGITUDE	10,250 ft. W 80°07'30"	10,400 ft. W 80°00'00"	4,400 ft. W 80°00'00"	500 ft. W 80°05'00"	6,000 ft. W 80°10'00"	9,600 ft. W 80°07'30"	10,600 ft. W 80°07'30"	1,550 ft. W 80°02'30"	1,950 ft. W 80°02'30"	1,900 ft. W 80°10'00"
DATE COMPLETED	2-22-85	2-10-85	1-23-87	3-24-85	4-23-85	4-11-85	5-31-85	5-23-85	8-15-85	8-16-85
ELEVATION	730 GR	1395 GR	1370 GR	1220 GR	732 GR	730 GR	740 GR	1470 GR	1420 GR	740 GR
LOGS RECEIVED AND LOGGED INTERVALS			COL/CNL: 2100-3790 PCL: 3450-3786		COL/CNL: 484-2867 PCL: 2690-2776			COL/CNL: 22-3849	COL/T: 2150-3905 PCL: 3500-3810	T/COL/GR: 1300-2866
TULLY LIMESTONE	1300-	2382-	2157-	1879-	1306-	1320-	1250-	2188-	2164-	1318-
ONONDAGA LIMESTONE HUNTERSVILLE CHERT	1500-	2601-	2370-	2098-	1512-	1520-	1300-	2410-	2386-	1524-
ORISKANY SANDSTONE RIDGELEY SANDSTONE	1750-	2855-	2604-		1774-	1755-	1750-	2668-	2462-	
SILURIAN-DEVONIAN CARBONATES	1780-		2686-	2326	1794-			2686-	2660-	1772-
SALINA GROUP LOCKPORT DOLOMITE		2905- 3550-	2782- 3282-		1884- 2278-		1900-	2774- 3284-	2750- 3288-	1882- 2300-
ROCHESTER SHALE IRONDEQUOIT DOLOMITE		3692- 3746-	3544- 3596-		2634- 2586-			3526- 3576-	3517- 3570-	2552- 2610-
GRINSBY FORMATION CAROT HEAD SHALE WHIRLPOOL SANDSTONE		3778- 3890- 3941-	3618- 3735- (not logged)		2616- 2692- 2770-		2040- 2520-	3608- 3692- 3764-	3604- 3684- 3760-	2718- 2740- 2786-
QUEENSTON FORMATION		3950-	(not logged)		2780-		2690-	3772-	3768-	2806-
PRODUCING FORMATION	Oriskany?	Medina	Medina	Marcellus & Onondaga	Medina	Driskany	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	1752	3810-3889	3655-3732	1884-2102	2636-2778	1765	2633-2668	3633-3771	3667-3703	2666-2708
TOTAL DEPTH	1840	4035	3790	2352	2885	1786	2850	3860	3905	2890
DEEPEST FORMATION REACHED	Bass Islands	Queenston	Queenston	Bass Islands	Queenston	Driskany	Queenston	Queenston	Queenston	Queenston
RESULTS	8,000 Mcf AF 720 psi/72 hrs. development Car Wash pool Erie field	1,100 Mcf AF 1,140 psi/168 hrs. development Swails pool Orumlin field	700 Mcf AF 1,100 psi/48 hrs. development Ocepeened 1192 ft. Swails pool Orumlin field	150 Mcf Nat. 680 psi/48 hrs. New pool discovery Oliver Road pool Erie field	500 Mcf AF 750 psi/240 hrs. development Charter Oaks pool Erie field	5,000 Mcf AF 750 psi/240 hrs. development Car Wash pool Erie field	1,300 Mcf AF 950 psi/48 hrs. development Charter Oaks pool Erie field	1,050 Mcf AF 1,050 psi/120 hrs. development Dunn Valley pool Erie field	400 Mcf AF 1,120 psi/48 hrs. development Swails pool Orumlin field	1,700 Mcf AF 900 psi/48 hrs. development Charter Oaks pool Erie field

COUNTY Permit Number	Erie 049-24770	Erie 049-24772	Erie 049-24773	Erie 049-24774	Erie 049-24775	Erie 049-24777	Erie 049-24778	Erie 049-24779	Erie 049-24780	Erie 049-24781
NAME OF WELL	Joseph Murphy #1	Ronald Meabon #5	A. R. Meller #1	Pineview #1	Stoltzfus #4	Olive Phillips #1	Lloyd Billings #2	Ronald Meabon #4	Stoltzfus #3	Alton Young #3
OPERATOR	Pegasus Exploration Company	Vineyard Oil & Gas Company	Meridian Exploration #051	City of Erie Housing Authority	King Oil & Gas Corporation	Vineyard Oil & Gas Company	Meridian Exploration #182	Vineyard Oil & Gas Company	King Oil & Gas Corporation	Vineyard Oil & Gas Company
TOWNSHIP	Venango	Venango	Washington	Erie	Concord	Venango	Washington	Venango	Concord	Venango
QUADRANGLE	Wattsburg	Wattsburg	Cambridge Spgs. NE	Erie South	Corry	Wattsburg	Cambridge Springs	Wattsburg	Corry	Wattsburg
LATITUDE	2,580 ft. S 42°05'00"	4,500 ft. S 42°02'30"	3,420 ft. S 41°55'00"	700 ft. S 42°05'00"	12,690 ft. S 41°55'00"	5,600 ft. S 42°02'30"	4,390 ft. S 41°52'30"	3,300 ft. S 42°02'30"	13,878 ft. S 41°55'00"	2,400 ft. S 42°02'30"
LONGITUDE	8,910 ft. W 79°50'00"	8,700 ft. W 79°47'30"	1,120 ft. W 80°05'00"	7,500 ft. W 80°05'00"	2,490 ft. W 79°37'30"	5,180 ft. W 79°47'30"	10,840 ft. W 80°00'00"	8,550 ft. W 79°47'30"	1,200 ft. W 79°37'30"	4,850 ft. W 79°47'30"
DATE COMPLETED	8-30-86	8-14-86	1-24-87	8-30-86	8-9-86	8-22-86	10-13-86	8-22-86	8-17-86	11-25-86
ELEVATION	1410 GR	1303 GR	1490 GR	890 GR	1848 GR	1400 GR	1296 GR	1321 GR	1861 GR	1445 GR
LOGS RECEIVED AND LOGGED INTERVALS		COL/CNL: 0-3837 DLL/GR: 510-3837 PCL/GR: 3500-3841		COL/GR: 0-3080	COL/CNL: 3300-5086 GO/GR: 3300-5086	COL/CNL: 0-3926 DLL/GR: 787-3944 PCL/GR: 2200-3920	COL/CNL: 407-4190 OIL/GR: 407-4192 INT: 3940-4124 PCL: 3900-4100	COL/CNL: 0-3795 OIL/GR: 524-3813 PCL/GR: 3500-3808	COL/CNL: 0-5152 GO/GR: 0-5152 INT: 0-5152	COL/CNL: 0-3932 OIL/GR: 1270-3950
TULLY LIMESTONE	2208-	2252-	2525-	1490-	3350-	2348-	2476-	2226-	3362-	2366-
ONONDAGA LIMESTONE HUNTERSVILLE CHERT	2438-	2478-	2737-	1710-	3616-	2578-	2694-	2452-	3626-	2594-
ORISKANY SANDSTONE RIDGELEY SANDSTONE			2937- Bois Blanc	1980-		Absent	2950-			
SILURIAN-DEVONIAN CARBONATES		2692-	2937-	1994-	3788-	2826-	2971-	2664-	3794-	2812-
SALINA GROUP LOCKPORT DOLOMITE	2740- 2996-	2764- 3244-	3124- 3568-	2084- 2500-	3844- 4436-	2906- 3350-	3014- 3592-	2740- 3220-	3832- 4454-	2884- 3362-
ROCHESTER SHALE IRONDEQUOIT DOLOMITE	3362- 3476-	3490- 3544-	3828- 3907-	2756- 2796-	4706- 4772-	3594- 3660-	3854- 3908-	3460- 3528-	4732- 4782-	3620- 3677-
GRIMSBY FORMATION CABOT HEAD SHALE WHIRLPOOL SANDSTONE	3492- 3612- 3646-	3582- 3690- 3730-	3964- 4067- 4103-	2828- 2943- 2982-	4820- 4920- 4976-	3689- 3808- 3852-	3944- 4044- 4112-	3558- 3672- 3710-	4832- 4931- 4984-	3710- 3808- 3860-
QUEENSTON FORMATION	3660-	3743-	4112-	2990-	4992-	3864-	4122-	3723-	5000-	3872-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Bois Blanc and Medina	Medina	Medina	Medina	Onondaga
PRODUCING INTERVAL	3570-3655	3613-3742	3977-4012	2750-3017	4883-4979	2784-2795 3727-3862	3989-4042	3584-3720	4884-4926	2703-2712
TOTAL DEPTH	3758	3864	4225	3082	5084	3980	4230	3850	5114	3965
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	IP not reported 1,800 psi/72 hrs. development Hornby pool North East field	5,000 Mcf AF 1,060 psi/240 hrs. development Bailey Brook pool North East field	119 Mcf AF 1,050 psi/168 hrs. development Edinboro North field	1,100 Mcf AF 950 psi/48 hrs. development Charter Oaks pool Erie field	500 Mcf AF 1,050 psi/72 hrs. development Stewart Road Concord field	500 Mcf AF 990 psi/196 hrs. development Bailey Brook pool North East field	1,750 Mcf AF 1,070 psi/168 hrs. development Edinboro North field	2,000 Mcf AF 1,130 psi/240 hrs. development Bailey Brook North East field	750 Mcf AF 975 psi/72 hrs. development Stewart Road pool Concord field	250 Mcf AF 640 psi/168 hrs. development Heabon pool North East field

Figure 36. (Continued).

COUNTY Permit Number	Erie 049-24782	Erie 049-24783	Erie 049-24786	Erie 049-24790	Erie 049-24791	Erie 049-24793	Erie 049-24794	Erie 049-24795	Erie 049-24796	Erie 049-24797
NAME OF WELL	Bo/Derrick #1	James Engles #1	State Public School Bldg. Authority #1	Olive Phillips #2	Oavid Bensink #3	Benjamin E. Tate #1	Elmer Lantz #6	Joseph Klick #1	Ralph Jones #2	Olive Phillips #1
OPERATOR	PACO, Incorporated	Pegasus Exploration Company	Mid American Natural Resources	Vineyard Oil & Gas Company	Vineyard Oil & Gas Company	Mid American Natural Resources	U. S. Energy Development Corp.	Vineyard Oil & Gas Company	Meridian Exploration #410	Vineyard Oil & Gas Company
TOWNSHIP	Conneaut	Venango	Summit	Venango	Venango	Erie	Venango	Venango	LeBoeuf	Venango
QUADRANGLE	East Springfield	Wattsburg	Erie South	Wattsburg	Wattsburg	Erie South	Wattsburg	Wattsburg	Millers Station	Wattsburg
LATITUDE	14,000 ft. S 41°55'00"	5,200 ft. S 42°05'00"	3,950 ft. S 42°02'30"	3,100 ft. S 42°02'30"	6,575 ft. S 42°02'30"	7,050 ft. S 42°07'30"	10,000 ft. S 42°02'30"	7,570 ft. S 42°02'30"	8,220 ft. S 41°52'30"	4,350 ft. S 42°02'30"
LONGITUDE	8,375 ft. W 80°27'30"	9,850 ft. W 79°50'00"	3,450 ft. W 80°05'00"	3,450 ft. W 79°47'30"	3,700 ft. W 79°45'00"	10,050 ft. W 80°05'00"	8,495 ft. W 79°45'00"	9,620 ft. W 79°47'30"	4,130 ft. W 79°57'30"	4,500 ft. W 79°47'30"
DATE COMPLETED	9-15-86	8-28-86	10-26-86	10-2-86	10-10-86	10-20-86	10-20-86	11-4-86	11-23-86	11-13-86
ELEVATION	951 GR	1380 GR	1270 GR	1461 GR	1575 GR	709 GR	1318 GR	1300 GR	1270 GR	1500 GR
LOGS RECEIVED AND LOGGED INTERVALS	CDL/CNL: 0-3483 OLL/GR: 0-3501	CDL/CNL: 1850-3572	CDL/CNL: 543-3977 OLL/GR: 1435-3950 PCL/GR: 3610-3935	CDL/CNL: 0-4002 DLL/GR: 1435-3950 PCL/GR: 3822-3941	T/COL/CNL: 1200-2815	COL/CNL: 0-2508 DLL/GR: 429-2526	COL/CNL: 992-3828 OLL/GR: 992-3846			COL/CNL: 1-4005 OLL/GR: 1240-4023
TULLY LIMESTONE	1774-	2202-	1923-	2388-	2360-	1250-	2200-	2260-	2562-	2468-
ONONDAGA LIMESTONE HUNTERSVILLE CHERT	1932-	2432-	2144-	2618-	2594-	1468-	2425-	2482-	2780-	2698-
ORISKANY SANDSTONE RIOGEEY SANDSTONE	2144-					1742-			2954- Bois Blanc	2912-
SILURIAN-DEVONIAN CARBONATES	2156-		2418-	2834-	2818-	1750-		2710-	2986-	2918-
SALINA GROUP LOCKPORT DOLOMITE	2312- 2846-	2738- 2996-	2508- 2990-	2910- 3400-	2906- 3436-	1834- 2236-		2782- 3276-	3100- 3620-	2990- 3450-
ROCHESTER SHALE IRONDEQUOIT DOLOMITE	3100- 3148-	3364- 3478-	3234- 3288-	3650- 3704-	3688- 3750-	2472- 2534-		3526- 3564-	3894- 3961-	3699- 3764-
GRIMSBY FORMATION CAROT HEAD SHALE WHIRLPOOL SANDSTONE	3178- 3294- 3340-	3494- 3626- 3648-	3323- 3400- 3474-	3739- 3662- 3892-	3774- 3696- 3934-	2556- 2650- 2718-		3607- 3731- 3768-	4020- 4120- 4164-	3798- 3820- 3950-
QUEENSTON FORMATION	3350-	3662-	3482-	3904-	3948-	2728-		3780-	4176-	3964-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Onondaga	Onondaga	Medina	Onondaga
PRODUCING INTERVAL	3201-3255	3557-3656	3340-3392	3741-3897	3822-3941	2580-2636	2454	2518-2532	4045-4071	2710-2762
TOTAL DEPTH	3520	3756	3595	3995	4054	2820	2545	3875	4284	4055
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Onondaga	Queenston	Queenston	Queenston
RESULTS	600 Mcf AF 975 psi/72 hrs. development Bushnell-Lexington pool Conneaut field	IP not reported 2,200 psi/72 hrs. development Half Moon pool North East field	400 Mcf AF 900 psi/48 hrs. extension Blass pool Erie field	800 Mcf AF 1,160 psi/240 hrs. development Bailey Brook pool North East field	2,000 Mcf AF 1,100 psi/96 hrs. development Carter Hill field	700 Mcf AF 950 psi/48 hrs. development Charter Oaks pool Erie field	15,000 Mcf Nat. 910 psi/72 hrs. development Macedonia pool Carter Hill field	10,000 Mcf AF 1,000 psi/48 hrs. development Meabon pool North East field	650 Mcf AF 1,080 psi/168 hrs. development Mill Village field	250 Mcf AF 710 psi/168 hrs. development Meabon pool North East field

COUNTY Permit Number	Erie 049-24798	Erie 049-24799	Erie 049-24802	Erie 049-24805	Erie 049-24806	Erie 049-24807	Erie 049-24808	Erie 049-24809	Erie 049-24811	Erie 049-24813
NAME OF WELL	Hazel Kelley #1	William Gregory #1	Frances Groenendaal #3	Anthony Masl #1	Fred Dean #1	Cliff Reese #1	Dan Percy #1	Joan Rembleak #1	Steve Kwiatkoski #3	Ronald Meabon #7
OPERATOR	Meridian Exploration #519	Mitch-Well Energy, Inc.	N.E.A. Cross Company	Mid American Natural Resources	Vineyard Oil & Gas Company	Pegasus Exploration Company	Pegasus Exploration Company	Meridian Exploration #213	Vineyard Oil & Gas Company	Vineyard Oil & Gas Company
TOWNSHIP	Washington	Venango	McKean	Millcreek	Venango	Venango	Venango	Washington	Venango	Venango
QUADRANGLE	Edinboro North	Wattsburg	Erie South	Erie South	Wattsburg	Wattsburg	Wattsburg	Cambridge Springs	Wattsburg	Wattsburg
LATITUDE	3,450 ft. S 41°55'00"	12,320 ft. S 42°02'30"	13,850 ft. S 42°02'30"	6,500 ft. S 42°07'30"	8,100 ft. S 42°02'30"	3,210 ft. S 42°05'00"	3,990 ft. S 42°05'00"	1,800 ft. S 41°52'30"	10,750 ft. S 42°05'00"	5,200 ft. S 42°02'30"
LONGITUDE	7,630 ft. W 80°07'30"	5,360 ft. W 79°50'00"	10,000 ft. W 80°02'30"	2,700 ft. W 80°00'00"	7,930 ft. W 79°47'30"	9,700 ft. W 79°50'00"	9,310 ft. W 79°50'00"	1,730 ft. W 80°02'30"	2,400 ft. W 79°47'30"	10,100 ft. W 79°47'30"
DATE COMPLETED	11-23-86	11-28-86	11-14-86	3-14-87	1-14-87	12-4-86	11-28-86	12-7-86	2-14-87	12-9-86
ELEVATION	1292 GR	1516 GR	1130 GR	1015 GR	1301 GR	1369 GR	1400 GR	1293 GR	1575 GR	1299 GR
LOGS RECEIVED AND LOGGED INTERVALS	COL/CNL: 425-3964 OLL/LL: 425-3966 INT: 3690-3871 PCL: 3724-3781		COL/GR: 1799-3526	COL/CNL: 0-3177	CNL/GR: 1903-3900	COL/CNL: 2100-3706	COL/CNL: 0-3738	PCL: 3992-4028	COL/CNL: 444-4029 PCL/GR: 3680-3990	COL/CNL: 630-3831 DLL/GR: 630-3831 PCL/GR: 3500-3828
TULLY LIMESTONE	2258-		1846-	1610-	2340-	2184-	2218-		2450-	2234-
ONONDAGA LIMESTONE HUNTERSVILLE CHERT	2462-		2068-	1832-	2568-	2410-	2442-		2682-	2458-
ORISKANY SANDSTONE RIDGELEY SANDSTONE			2330-							
SILURIAN-DEVONIAN CARBONATES	2740-		2342-	2094-	2788-	2642-	2672-		2916-	2676-
SALINA GROUP LOCKPORT DOLOMITE	2816- 3358-	3345- 3420-	2430- 2920-	2186- 2580-	2866- 3314-	2680- 3124-	2742- 3154-		2982- 3436-	2750- 3240-
ROCHESTER SHALE IRONDEQUOIT DOLOMITE	3605- 3662-	3800-	3176- 3234-	2842- 2890-	3558- 3628-	3370- 3436-	3402- 3466-	3890-	3684- 3752-	3482- 3550-
GRIMSBY FORMATION CAROT HEAD SHALE WHIRLPOOL SANDSTONE	3696- 3814- 3862-	3825- 3846- 3883-	3273- 3384- 3424-	2932- 3022- 3076-	3650- 3780- 3820-	3456- 3597- 3622-	3497- 3624- 3650-	3913- 4030- 4092-	3774- 3900- 3930-	3585- 3695- 3730-
QUEENSTON FORMATION	3870-	4002-	3432-	3088-	3828-	3632-	3660-	4100-	3942-	3742-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Salina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	3724-3781	3855-3999	3322-3342	2949-3014	3105-3138	3522-3628	3581-3657	3992-4028	3805-3942	3603-3738
TOTAL DEPTH	3969	4100	3530	3188	3920	3706	3771	4198	4024	3846
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	335 Mcf AF 1,050 psi/168 hrs. development Franklin Center field	2,500 Mcf AF 1,250 psi/48 hrs. development Carter Hill field	3,500 Mcf AF 1,120 psi/48 hrs. development Dunn Valley pool Erie field	400 Mcf AF 950 psi/48 hrs. development Glenwood pool Erie field	250 Mcf AF 400 psi/120 hrs. New pool discovery Dean pool North East field	IP not reported 1,050 psi/72 hrs. development Hornby North East field	IP not reported 1,000 psi/72 hrs. development Hornby North East field	84 Mcf AF 1,000 psi/168 hrs. development Edinboro North field	2,500 Mcf AF 1,120 psi/96 hrs. development Bailey Brook pool North East field	750 Mcf AF 1,070 psi/168 hrs. development Bailey Brook pool North East field

Figure 36. (Continued).

COUNTY Permit Number	Erie 049-24814	Erie 049-24816	Erie 049-24817	Erie 049-24818	Erie 049-24819	Erie 049-24820	Erie 049-24821	Erie 049-24822	Erie 049-24825	Erie 049-24827
NAME OF WELL	Myra Gould #1	Chuck Byers #1	Edward Ombrowski #2	Stanley Szmanowski #1	Boyd Hess #1	Rowland #2	Glenn Troyer #5	Amos K. Flint #3	Master Mold #1	Raleigh Johnson #1
OPERATOR	N.E.A. Cross Company	Pegasus Exploration Company	Vineyard Oil & Gas Company	N.E.A. Cross Company	N.E.A. Cross Company	Troyer Energies, Inc.	Troyer Energies, Inc.	James Drilling Corporation	Mid American Natural Resources	Envirogas, Incorporated
TOWNSHIP	McKean	Venango	Venango	McKean	McKean	LeBoeuf	LeBoeuf	Conneaut	Millcreek	Waterford
QUADRANGLE	Cambridge Spgs. NE	Wattsburg	Wattsburg	Erie South	Erie South	Millers Station	Waterford	Beaver Center	Swanville	Waterford
LATITUDE	300 ft. S 42°00'00"	3,600 ft. S 42°05'00"	420 ft. S 42°02'30"	11,400 ft. S 42°02'30"	15,100 ft. S 42°02'30"	1,200 ft. S 41°52'30"	1,150 ft. S 42°00'00"	7,500 ft. S 41°52'30"	12,150 ft. S 42°07'30"	12,450 ft. S 42°00'00"
LONGITUDE	7,800 ft. W 80°02'30"	8,500 ft. W 79°50'00"	8,320 ft. W 79°45'00"	3,300 ft. W 80°05'00"	9,900 ft. W 80°02'30"	7,630 ft. W 79°57'30"	3,200 ft. W 79°57'30"	9,800 ft. W 80°22'30"	5,100 ft. W 80°07'30"	4,570 ft. W 79°52'30"
DATE COMPLETED	7-1-87	12-14-86	12-20-86	6-2-87	12-19-86	12-24-86	12-18-86	12-29-86	1-21-87	1-16-87
ELEVATION	1280 GR	1406 GR	1570 GR	1105 GR	1215 GR	1169 GR	1185 GR	852 GR	730 GR	1410 GR
LOGS RECEIVED AND LOGGED INTERVALS	COL/GR: 1979-3674	COL/CNL: 2200-3750	COL/CNL: 469-4108 OLL/GR: 1600-4096 PCL/GR: 3750-4066	COL/GR: 1739-3488	COL/GR: 1894-3615	COL/CNL: 2350-4131 GR/LL: 2350-4131 PCL: 3600-4023	COL/GR: 2200-4048 GR/LL: 2200-4048 PCL: 3550-3937	COL/GR: 250-3443 CNL/GR: 3150-3418 OO: 3050-3429	COL/CNL: 1250-2831	COL/GR: 400-4036 OLL/GR: 2000-4023
TULLY LIMESTONE	2012-	2230-	2486-	1800-	1938-	2382-	2266-		1282-	2338-
ONONDAGA LIMESTONE HUNTERSVILLE CHERT	2234-	2460-	2718-	2018-	2156-	2604-	2482-	1980-	1496-	2566-
ORISKANY SANDSTONE RIOGLEY SANDSTONE	2494-			2276-	2418-	2854-	2752-		1774-	2804-
SILURIAN-DEVONIAN CARBONATES	3514-	2688-	2940-	2290-	2432-	2880-	2764-	2246-	1780-	2810-
SALINA GROUP LOCKPORT DOLOMITE	2607- 3110-	2768- 3170-	3012- 3500-	2378- 2876-	2520- 3010-	2918- 3472-	2850- 3392-	2325- 2864-	1866- 2272-	2888- 3424-
ROCHESTER SHALE IRONDEQUOIT DOLOMITE	3358- 3408-	3416- 3482-	3748- 3816-	3136- 3188-	3270- 3328-	3740- 3796-	3666- 3720-	3120- 3169-	2500- 2564-	3684- 3748-
GRIMSBY FORMATION CAROT HEAD SHALE WHIRLPOOL SANDSTONE	3448- 3522- 3598-	3514- 3638- 3668-	3848- 3968- 4000-	3218- 3296- 3376-	3349- 3448- 3517-	3818- 3948- 3997-	3741- 3860- 3918-	3194- 3319- 3358-	2584- 2717- 2750-	3768- 3850- 3936-
QUEENSTON FORMATION	3606-	3676-	4014-	3383-	3523-	4010-	3926-	3378-	2758-	3948-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	3461-3509	3586-3674	3913-4005	3269-3291	3389-3426	3896-3930	3783-3809	3267-3302	2613-2708	3825-3850
TOTAL DEPTH	3689	3750	4115	3497	3619	4131	4048	3445	2844	4040
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	500 Mcf AF 1,100 psi/48 hrs. development Ounn Valley pool Erie field	IP not reported 1,000 psi/72 hrs. development Hornby pool North East field	3,000 Mcf AF 1,200 psi/168 hrs. development Carter Hill field	500 Mcf AF 1,050 psi/48 hrs. extension Ounn Valley pool Erie field	1,200 Mcf AF 950 psi/48 hrs. development Dunn Valley pool field	250 Mcf AF 700 psi/48 hrs. development Mill Village field	200 Mcf AF 800 psi/48 hrs. development Waterford pool LeBoeuf field	354 Mcf AF 1,000 psi/72 hrs. development Bushnell-Lexington pool Conneaut field	1,000 Mcf AF 900 psi/48 hrs. development Charter Daks pool field	1,250 Mcf AF 835 psi/48 hrs. development Waterford pool LeBoeuf field

COUNTY Permit Number	Erie 049-24828	Erie 049-24829	Erie 049-24830	Erie 049-24831	Erie 049-24833	Erie 049-24835	Erie 049-24837	Erie 049-24838	Erie 049-24839	Erie 049-24840
NAME OF WELL	Larry Kalika #4A	Wave/Phillips #1	William Flick #1	Willie Czesnowski #5	Milton Vogel #1	Ronald Meabon #6	George Adolphson #1	American Sterilizer Company #1	American Sterilizer Company #2	Gertrude Vogel #1
OPERATOR	Envirogen, Incorporated	Vineyard Oil & Gas Company	King Oil & Gas Corporation	Robert H. Brace	Mid American Natural Resources	Vineyard Oil & Gas Company	Mid American Natural Resources	Mid American Natural Resources	Mid American Natural Resources	Mid American Natural Resources
TOWNSHIP	Wayne	Venango	Concord	Waterford	Venango	Venango	Amity	Millcreek	Millcreek	Venango
QUADRANGLE	Corry	Wattsburg	Corry	Cambridge Spgs., NE	Hammett	Wattsburg	Union City	Swanville	Swanville	Wattsburg
LATITUDE	9,160 ft. S 42°00'00"	11,280 ft. S 42°02'30"	9,460 ft. S 41°55'00"	13,700 ft. S 42°00'00"	13,650 ft. S 42°02'30"	5,700 ft. S 42°02'30"	4,200 ft. S 42°00'00"	10,550 ft. S 42°07'30"	11,250 ft. S 42°07'30"	14,100 ft. S 42°02'30"
LONGITUDE	7,550 ft. W 79°40'00"	10,900 ft. W 79°47'30"	1,500 ft. W 79°42'30"	3,400 ft. W 80°02'30"	200 ft. W 79°52'30"	8,600 ft. W 79°47'30"	9,550 ft. W 79°50'00"	1,990 ft. W 80°07'30"	600 ft. W 80°07'30"	7,600 ft. W 79°50'00"
DATE COMPLETED	1-11-87	1-31-87	1-10-87	1-6-87	2-5-87	3-3-87	2-21-87	2-7-87	2-26-87	2-13-87
ELEVATION	1870 GR	1338 GR	1505 GR	1385 GR	1590 GR	1295 GR	1440 GR	720 GR	735 GR	1390 GR
LOGS RECEIVED AND LOGGED INTERVALS	CDL/GR: 415-4686 DLL/GR: 2670-4675	CDL/CNL: 1772-3865 DLL/GR: 1772-3882	CDL/CNL: 469-4617 DLL/LJ: 469-4619 INT: 4310-4520	CDL/CNL: 2250-3952	CDL/CNL: 2350-4136	CDL/CNL: 0-2780 DLL/GR: 1501-2768	CDL/CNL: 2300-4071	CDL/CNL: 1250-2845		CDL/CNL: 2200-3971
TULLY LIMESTONE	2980-	2296-	2936-	2293-	2468-	2294-	2381-	1266-	1288-	2297-
ONONDAGA LIMESTONE HUNTERSVILLE CHERT	3228-	2522-	3186-	2512-	2694-	2522-	2614-	1484-	1500-	2526-
ORISKANY SANDSTONE RIDGELEY SANDSTONE	3436-		3370-	2748-	2930-		2848-	1770-	1794-	
SILURIAN-DEVONIAN CARBONATES	3454-	2754-	3392-	2770-	2940-	2742-	2862-	1776-		2766-
SALINA GROUP LOCKPORT DOLOMITE	3510- 4068-	2830- 3230-	3420- 3980-	2860- 3538-	3018- 3542-		2930- 3464-	1856- 2264-	1838- 2413-	2848- 3370-
ROCHESTER SHALE IRONDEQUOIT DOLOMITE	4320- 4388-	3558- 3626-	4238- 4304-	3596- 3658-	3790- 3852-		3716- 3780-	2498- 2560-	2599-	3630- 3684-
GRIMSBY FORMATION CAROT HEAD SHALE WHIRLPOOL SANDSTONE	4428- 4522- 4576-	3663- 3763- 3816-	4344- 4440- 4500-	3679- 3794- 3850-	3874- 3968- 4040-		3814- 3920- 3970-	2582- 2676- 2746-	2614- 2730-	3716- 3826- 3874-
QUEENSTON FORMATION	4592-	3828-	4517-	3858-	4050-		3980-	2756-	2778-	3882-
PRODUCING FORMATION	Medina	Onondaga	Medina	Medina	Medina	Onondaga	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	4493-4587	2530-2564	4382-4510	3738-3791	3918-3996	2628-2650	3849-3918	2608-2654	2649-2688	3745-3821
TOTAL DEPTH	4690	3905	4593	3952	4136	2774	4075	2844	2884	3971
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Heiderberg	Queenston	Queenston	Queenston	Queenston
RESULTS	1,000 Mcf AF 960 psi/72 hrs. development Corry field	500 Mcf AF 960 psi/168 hrs. extension Meabon pool North East field	250 Mcf AF 1,150 psi/72 hrs. development Harbor Ridge pool Concord field	1,000 Mcf AF 1,100 psi/48 hrs. development Edinboro North field	2,100 Mcf AF 1,150 psi/48 hrs. development Dennee pool Phillipsville field	500 Mcf Nat. 7,000 Mcf AF 825 psi/168 hrs. development Meabon pool North East field	400 Mcf AF 1,100 psi/48 hrs. development Waterford pool LeBoeuf field	700 Mcf AF 960 psi/48 hrs. development Charter Oaks pool Erie field	400 Mcf AF 1,000 psi/48 hrs. development Charter Oaks pool Erie field	975 Mcf AF 1,075 psi/48 hrs. extension Wattsburg pool North East field

Figure 36. (Continued).

COUNTY Permit Number	Erie 049-24841	Erie 049-24843	Erie 049-24847	Erie 049-24848	Erie 049-24852	Erie 049-24856	Erie 049-24857	Erie 049-24859	Erie 049-24860	Erie 049-24861
NAME OF WELL	Francis Oylewski #1	Willie Czesnowski #6	Harley Bruyagin #2	Robert H. Brace #5	Sophia Good #1	Oerrick Trask #1	Norman Haibach #1	John Gauer #2	Paul Henkel #1	William Mack #1
OPERATOR	Vineyard Oil & Gas Company	Robert H. Brace	Vineyard Oil & Gas Company	Robert H. Brace	Vineyard Oil & Gas Company	King Oil & Gas Corporation	N.E.A. Cross Company	Vineyard Oil & Gas Company	Vineyard Oil & Gas Company	King Oil & Gas Corporation
TOWNSHIP	McKean	Waterford	Venango	McKean	Venango	Concord	McKean	Waterford	Venango	Wayne
QUADRANGLE	Swanville	Cambridge Spgs. NE	Wattsburg	Cambridge Spgs. NE	Hammett	Columbus	Cambridge Spgs. NE	Cambridge Spgs. NE	Wattsburg	Corry
LATITUDE	14,680 ft. S 42°02'30"	13,800 ft. S 42°00'00"	10,520 ft. S 42°02'30"	9,300 ft. S 42°00'00"	13,720 ft. S 42°02'00"	4,550 ft. S 41°55'00"	4,700 ft. S 42°00'00"	600 ft. S 42°00'00"	5,800 ft. S 42°02'30"	3,140 ft. S 41°57'30"
LONGITUDE	1,180 ft. W 80°07'30"	2,300 ft. W 80°02'30"	1,750 ft. W 79°50'00"	1,600 ft. W 80°02'30"	4,640 ft. W 79°52'30"	8,990 ft. W 79°35'00"	2,700 ft. W 80°02'30"	1,600 ft. W 80°00'00"	1,500 ft. W 79°50'00"	50 ft. W 79°37'30"
DATE COMPLETED	1-24-87	2-1-87	2-7-87	2-6-87	2-15-87	2-20-87	6-11-87	3-8-87	3-7-87	3-17-87
ELEVATION	1070 GR	1390 GR	1522 GR	1270 GR	1377 GR	1550 GR	1225 GR	1230 GR	1342 GR	1630 GR
LOGS RECEIVED AND LOGGED INTERVALS	CDL/CNL: 490-3474 OLL/GR: 690-3460 PCL: 3243-3390	COL/CNL: 2300-4006 PCL: 3550-3881	COL/CNL: 550-4046 OLL/GR: 1396-4064 PCL/GR: 3698-4046	COL/T: 2050-3783 PCL: 3350-3706	COL/CNL: 486-3802 LL/GR: 1300-3788 PCL: 2477-270	COL/CNL: 509-4729 OLL/GR: 2803-4716	CDL/GR: 1900-3700	COL/CNL: 501-3701 OLL/GR: 750-3688 PCL: 3438-3585	COL/CNL: 524-3841 DLL/GR: 524-3841	COL/CNL: 2856-4595 OLL: 2800-4580
TULLY LIMESTONE	1808-	2340-	2834-	2090-	2172-	2938-	1994-	1990-	2260-	2916-
ONONDAGA LIMESTONE HUNTERSVILLE CHERT	2024-	2560-	2662-	2312-	2400-	3212-	2213-	2220-	2486-	3182-
ORISKANY SANDSTONE RIDGELEY SANDSTONE	2294-	2800-		2570-	2670-		2462-	2472-		3382-
SILURIAN-DEVONIAN CARBONATES	2302-	2810-	2894-	2588-	2674-	3390-	2484-	2490-	2716-	3394-
SALINA GROUP LOCKPORT DOLOMITE	2388- 2878-	2900- 3362-	2974- 3480-	2680- 3160-	2754- 3200-	3464- 4052-	2572- 3070-	2552- 3076-	2790- 3258-	3438- 3984-
ROCHESTER SHALE IRONDEQUOIT DOLOMITE	3144- 3192-	3638- 3666-	3734- 3800-	3424- 3484-	3460- 3508-	4320- 4384-	3334- 3368-	3324- 3388-	3504- 3572-	4246- 4308-
GRIMSBY FORMATION CABOT HEAD SHALE WHIRLPOOL SANDSTONE	3213- 3340- 3386-	3708- 3838- 3883-	3828- 3938- 3986-	3504- 3608- 3677-	3528- 3668- 3690-	4430- 4554- 4588-	3420- 3502- 3580-	3410- 3508- 3582-	3606- 3716- 3758-	4348- 4458- 4502-
QUEENSTON FORMATION	3392-	3889-	3998-	3684-	3703-	4597-	3588-	3587-	3774-	4514-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Onondaga	Medina
PRODUCING INTERVAL	3243-3390	3788-3829	3865-3995	3544-3576	3577-3701	4475-4548	3466-3499	3438-3585	2518-2549	4407-4467
TOTAL DEPTH	3485	4006	4085	3783	3800	4718	3745	3700	3870	4515
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	330 Mcf AF 1,020 psi/144 hrs. extension Blas pool Erie field	1,500 Mcf AF 1,100 psi/144 hrs. development Swails pool Drumlin field	250 Mcf AF 700 psi/144 hrs. development Wattsburg pool North East field	1,250 Mcf AF 1,100 psi/144 hrs. development Swails pool Orumlin field	200 Mcf AF 1,025 psi/195 hrs. development Dennis Phillipsville field	1,000 Mcf AF 1,200 psi/172 hrs. extension Stewart Road pool Concord field	6,000 Mcf AF 1,100 psi/148 hrs. development Swails pool Orumlin field	2,000 Mcf AF 1,100 psi/144 hrs. development Talcott pool Erie field	330 Mcf AF 770 psi/48 hrs. development Wattsburg pool North East field	500 Mcf AF 1,075 psi/72 hrs. development Brookstraw field

SUMMARIZED RECORDS OF DEEP WELLS

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COUNTY Permit Number	Erie 049-24862	Erie 049-24864	Erie 049-24865	Erie 049-24866	Erie 049-24870	Erie 049-24878	Indiana 063-29167	Indiana 063-29411	Mercer 085-20728	Mercer 085-20743
NAME OF WELL	William Mack #2	William Mack #4	James Hammond #1	James Hammond #2	Robert Craker #1	Travelers Motel #1	N. Pineton Unit O #1	Larry Hill #1	Ansell #1	J. Christy #1
OPERATOR	King Oil & Gas Corporation	King Oil & Gas Corporation	King Oil & Gas Corporation	King Oil & Gas Corporation	Envirogas, Incorporated	Travelers Motel	CMG Development Company	Felmont Oil Corp. #F-544	PomineX, Inc.	Atlas Resources, Inc.
TOWNSHIP	Wayne	Wayne	Concord	Concord	Wayne	Summit	Green	Pine	Salem	Hermitage
QUADRANGLE	Corry	Columbus	Corry	Corry	Corry	Erie South	Barnesboro	Strongstown	Greenville East	Sharon East
LATITUDE	1,380 ft. S 41°57'30"	13,925 ft. S 42°00'00"	10,950 ft. S 41°55'00"	10,550 ft. S 41°55'00"	8,150 ft. S 42°00'00"	12,890 ft. S 42°05'00"	5,625 ft. S 40°42'30"	6,510 ft. S 40°37'30"	7,950 ft. S 41°30'00"	13,400 ft. S 41°15'00"
LONGITUDE	50 ft. W 79°37'30"	9,140 ft. W 79°35'00"	3,920 ft. W 79°42'30"	5,550 ft. W 79°42'30"	6,250 ft. W 79°40'00"	10,800 ft. W 80°02'30"	2,750 ft. W 78°50'00"	3,980 ft. W 78°55'00"	5,400 ft. W 80°17'30"	8,300 ft. W 80°25'00"
DATE COMPLETED	3-12-87	3-26-87	3-16-87	3-21-87	3-19-87	6-7-87	11-7-86	8-7-87	10-25-85	10-3-86
ELEVATION	1589 GR	1673 GR	1520 GR	1490 GR	1760 GR	1220 GR	1794 GR	1905 GR	1290 GR	1145 GR
LOGS RECEIVED AND LOGGED INTERVALS	COL/CNL: 2800-4546 DLL: 2800-4532	COL/CNL: 2754-4530 DLL/GR: 2400-4529	COL/CNL: 2800-4636 OLL: 3083-4672	COL/CNL: 2800-4602 OLL: 2800-4588	COL/GR: 437-4557 DLL/GR: 2837-4545		COL/CNL: 1608-8486		COL/GR: 300-5010	COL/CNL: 640-5477 OLL/GR: 640-5477 PCL: 4820-5479 INI: 5220-5440
TULLY LIMESTONE	2834-	2873-	2934-	2904-	2858-	1886-	7494-	7340-	3158-	3400-
ONONDAGA LIMESTONE HUNTERSVILLE CHERT	3096-	3134-	3184-	3152-	3106-	2114-	8224- 8236-	8070- 8090-	3310-	-3556
ORISKANY SANDSTONE RIDGELEY SANDSTONE						2362-	8324-	8145-	3500-	3740-
SILURIAN-DEVONIAN CARBONATES	3296-	3330-	3366-	3340-	3316-	2476-	8360-	8255-	3512-	3762-
SALINA GROUP LOCKPORT DOLOMITE	3350- 3912-	3390- 3946-	3420- 3978-	3394- 3948-	3392- 3944-	2740- 2900-			3620- 4356-	3832- 4776-
ROCHESTER SHALE IRONDEQUOIT DOLOMITE	4174- 4236-	4203- 4268-	4240- 4298-	4208- 4272-	4198- 4264-	3126- 3246-			4660- 4710-	5092- 5130-
GRIMSBY FORMATION CARBON SHALE WHIRLPOOL SANDSTONE	4276- 4400- 4436-	4308- 4420- 4468-	4340- 4460- 4496-	4314- 4408- 4470-	4302- 4408- 4456-	3286- 3376- 3420-			4768- 4919- 4950-	5226- 5340- 5422-
QUEENSTON FORMATION	4447-	4478-	4514-	4482-	4468-	3432-			4967-	5432-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Huntersville	Huntersville Ridgeley	Medina	Medina
PRODUCING INTERVAL	4312-4391	4359-4471	4373-4459	4353-4480	4342-4464	3288-3423	8242-8282	8100-8197	4816-4866	5376-5431
TOTAL DEPTH	4555	4588	4619	4573	4561	3544	8490	8255	5039	5484
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Helderberg	Helderberg	Queenston	Queenston
RESULTS	500 Mcf AF 1,075 psi/72 hrs. development Brokenstraw field	750 Mcf AF 1,100 psi/72 hrs. development Brokenstraw field	100 Mcf AF 800 psi/72 hrs. development Harbor Ridge pool Concord field	200 Mcf AF 1,100 psi/72 hrs. development Harbor Ridge pool Concord field	1,500 Mcf AF 1,130 psi/240 hrs. development Spencer Creek pool Corry field	72 Mcf AF 900 psi/72 hrs. extension Bloss pool Erie field	731 Mcf AF 4,210 psi/72 hrs. development Uniontown pool Living Waters field	1,700 Mcf Nat. 850 Mcf AF 2,775 psi/24 hrs. New pool discovery Alrshaft pool Hoto field	500 Mcf AF 1,200 psi/72 hrs. development pool Sheakleyville field	1,440 Mcf AF 1,050 psi/48 hrs. development Sharon Bee pool Sharon field

Figure 36. (Continued).

COUNTY Permit Number	Mercer 085-20777	Mercer 085-20783	Mercer 085-20787	Mercer 085-20792	Mercer 085-20793	Mercer 085-20794	Mercer 085-20807	Mercer 085-20808	Mercer 085-20809	Mercer 085-20819
NAME OF WELL	John Marriott #1	R. Keifer #2	Jerome Zrellak #1	William Rombold #1	Rollinson #1	Shenango Valley Osteopathic Hospital	A. Johnson Unit #1	L. Gill Unit #1	R. Walker Unit #1	S. Hostetler #1
OPERATOR	Atlas Resources, Inc.	Atlas Resources, Inc.	Atlas Resources, Inc.	Atlas Resources, Inc.	Atlas Resources, Inc.	Atlas Resources, Inc.	R. O. Werner Company, Inc.	R. O. Werner Company, Inc.	R. O. Werner Company, Inc.	Haddad and Brooks, Inc.
TOWNSHIP	Hermitage	Hermitage	Hermitage	Hermitage	Hermitage	Hermitage	Sugar Grove	Sugar Grove	Salem	French Creek
QUADRANGLE	Sharon East	Sharon East	Sharon East	Sharon East	Sharon East	Sharon East	Greenville East	Greenville East	Greenville East	New Lebanon
LATITUDE	0 ft. S 41°12'30"	5,500 ft. S 41°12'30"	10,950 ft. S 41°15'00"	11,950 ft. S 41°15'00"	11,325 ft. S 41°15'00"	14,500 ft. S 41°15'00"	6,100 ft. S 41°30'00"	14,950 ft. S 41°30'00"	6,100 ft. S 41°30'00"	4,100 ft. S 41°27'30"
LONGITUDE	9,450 ft. W 80°25'00"	2,450 ft. W 80°25'00"	5,160 ft. W 80°25'00"	2,625 ft. W 80°27'30"	1,875 ft. W 80°25'00"	8,650 ft. W 80°27'30"	10,700 ft. W 80°17'30"	10,400 ft. W 80°20'00"	9,200 ft. W 80°17'30"	1,800 ft. W 80°05'00"
DATE COMPLETED	10-16-86	11-20-86	11-8-86	12-30-85	12-29-86	10-23-86	6-4-86	5-26-86	6-11-86	11-29-86
ELEVATION	1158 GR	1130 GR	1138 GR	1014 GR	1126 GR	1074 GR	1175 GR	1150 GR	1225 GR	1447 GR
LOGS RECEIVED AND LOGGED INTERVALS	COL/CNL: 680-5552			COL/GR: 4196-5275 PCL: 4196-5275		COL/CNL: 593-5429	CNL/GR: 400-3910 PCL: 4460-4862	CNL/GR: 300-4828	CNL/GR: 250-4901 PCL: 4706-4759	PCL/GR: 3800-5557
TULLY LIMESTONE	3260-					3148-				
ONONDAGA LIMESTONE HUNTERSVILLE CHERT	3570-	3562-	3555-	3328-	3556-	3452-	3150-	3096-	3198-	3850-
ORISKANY SANDSTONE RIDGELY SANDSTONE	3754-	3740-	3734-	3564-	3730-	3640-	3344-	3300-	3390-	4002-
SILURIAN-DEVONIAN CARBONATES	3778-	3764-	3760-	3586-	3756-	3658-	3353-	3312-	3400-	4034-
SALINA GROUP LOCKPORT DOLOMITE	3952- 4796-	3934- 4792-	3922- 4786-	3718- 4600-	3922- 4774-	3832- 4678-	3416- 4200-	3420- 4168-	3506- 4248-	4144- 4890-
ROCHESTER SHALE IRONDEQUOIT DOLOMITE	5106- 5208-	5096- 5157-	5088- 5143-	4904- 4860-	5070- 5136-	4990- 5048-	4523- 4577-	4484- 4536-	4550- 4602-	5171- 5271-
GRIMSBY FORMATION CARBONATE SHALE WHIRLPOOL SANDSTONE	5245- 5368- 5440-	5362- 5438-	5340- 5420-	5038- 5158- 5235-	5336- 5406-	5126- 5245- 5320-	4630- 4737- 4820-	4590- 4698- 4770-	4658- 4770- 4842-	5320- 5439- 5502-
QUEENSTON FORMATION	5451-	5445-	5424-	5246-	5418-	5329-	4832-	4788-	4856-	5513-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	5293-5398	5288-5359	5262-5373	5090-5153	5256-5332	5177-5236	4679-4732	4628-4782	4706-4769	5374-5431
TOTAL DEPTH	5567	5509	5511	5298	5506	5444	4865	4846	4925	5584
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	1,230 Mcf AF 1,400 psi/48 hrs. development Wheatland field	1,480 Mcf AF 1,400 psi/48 hrs. extension Greenfield field	1,180 Mcf AF 1,500 psi/48 hrs. development Sharon Deep pool field	520 Mcf AF 1,250 psi/48 hrs. development Wheatland field	1,260 Mcf AF 1,375 psi/48 hrs. development Sharon Deep pool field	950 Mcf AF 1,300 psi/48 hrs. development Wheatland field	1,400 Mcf AF 1,440 psi/72 hrs. development Osborn pool field	700 Mcf AF 1,425 psi/72 hrs. extension Jamestown field	862 Mcf AF 1,470 psi/72 hrs. development Osborn pool field	800 Mcf AF 1,500 psi/72 hrs. development Kant2 Corners field

COUNTY Permit Number	Mercer 085-20820	Mercer 085-20821	Mercer 085-20822	Mercer 085-20825	Mercer 085-20834	Mercer 085-20835	Mercer 085-20836	Mercer 085-20837	Mercer 085-20838	Mercer 085-20839
NAME OF WELL	J. Onley #1	Frank D'Kresik #1	Hidden Acres #1	Frank O'Kresik #2	E. Breese #2	L. Jacobs #1	Voorhies-Yoder Unit #1	Anthony DeMarco #1	G.S.W. Unit #1	R. C. Olocese of Eric #1
OPERATOR	Haddad and Brooks, Inc.	Atlas Resources, Inc.	Atlas Resources, Inc.	Atlas Resources, Inc.	Haddad and Brooks, Inc.	Haddad and Brooks, Inc.	Mark Resources Corporation	Atlas Resources, Inc.	Haddad and Brooks, Inc.	Atlas Resources, Inc.
TOWNSHIP	Deer Creek	Hermitage	Hermitage	Hermitage	Deer Creek	French Creek	Lake	Hermitage	Deer Creek	Hermitage
QUADRANGLE	New Lebanon	Sharon East	Sharon East	Sharon East	New Lebanon	New Lebanon	Jackson Center	Sharon East	New Lebanon	Sharon East
LATITUDE	2,500 ft. S 41°27'30"	610 ft. S 41°12'30"	13,420 ft. S 41°15'00"	885 ft. S 41°12'30"	800 ft. S 41°27'30"	750 ft. S 41°27'30"	2,550 ft. S 41°22'30"	720 ft. S 41°12'30"	7,170 ft. S 41°27'30"	9,000 ft. S 41°15'00"
LONGITUDE	6,500 ft. W 80°05'00"	5,550 ft. W 80°25'00"	6,150 ft. W 80°25'00"	7,715 ft. W 80°25'00"	5,650 ft. W 80°05'00"	5,950 ft. W 80°02'30"	10,750 ft. W 80°07'30"	3,780 ft. W 80°25'00"	6,440 ft. W 80°05'00"	2,800 ft. W 80°27'30"
DATE COMPLETED	1-21-87	10-10-86	10-29-86	12-15-86	12-19-86	1-9-87	12-2-86	12-10-86	12-9-86	12-19-86
ELEVATION	1449 GR	1128 GR	1143 GR	1161 GR	1451 GR	1410 GR	1175 GR	1085 GR	1427 GR	1115 GR
LOGS RECEIVED AND LOGGED INTERVALS	PCL/GR: 3700-5512	CDL/CHL: 682-5520	INT: 5200-5450		PCL/GR: 3800-5500	PCL/GR: 5100-5513	COL/CHL: 0-5408 OLL/GR: 0-5408 INT: 3635-3834 PCL: 5150-5316		PCL/GR: 3800-5500	
TULLY LIMESTONE		3255-					3480-			
ONONDAGA LIMESTONE HUNTERSVILLE CHERT	3803-	3574-	3571-	3590-	3799-	3846-	3638-	3540-	3815-	3450-
ORISKANY SANDSTONE RIDGELEY SANDSTONE	3958-	3751-	3754-	3772-	3954-	3988-	3790-	3712-	3971-	3636-
SILURIAN-DEVONIAN CARBONATES	3988-	3774-	3780-	3800-	3985-	4001-	3820-	3736-	4002-	3654-
SALINA GROUP LOCKPORT DOLOMITE	4062- 4867-	3944- 4794-	3914- 4794-	3968- 4838-	4062- 4850-	4873-	3938- 4694-	3906- 4764-	4082- 4876-	3824- 4660-
ROCHESTER SHALE IRONDEQUOIT DOLOMITE	5154- 5224-	5102- 5164-	5102- 5158-	5124- 5184-	5153- 5216-	5170- 5242-	4988- 5070-	5062- 5122-	5176- 5242-	4980- 5038-
GRIMSBY FORMATION CAROT HEAD SHALE WHIRLPOOL SANDSTONE	5282- 5404- 5470-	5242- 5361- 5434-	5240- 5356- 5432-	5380- 5455-	5274- 5397- 5462-	5294- 5419- 5481-	5138- 5246- 5312-	5322- 5394-	5300- 5410- 5478-	5230- 5306-
QUEENSTON FORMATION	5480-	5448-	5441-	5468-	5470-	5492-	5326-	5406-	5486-	5320-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	5327-5401	5291-5446	5283-5393	5308-5378	5329-5390	5352-5411	5181-5236	5319-5343	5357-5406	5155-5226
TOTAL DEPTH	5545	5535	5512	5548	5528	5548	5409	5489	5560	5402
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	1,000 Mcf AF 1,400 psi/72 hrs. Kantz Corners field	1,500 Mcf AF 1,400 psi/48 hrs. development Wheatland field	1,050 Mcf AF 1,350 psi/48 hrs. development Sharon Deep pool field	1,520 Mcf AF 1,375 psi/48 hrs. development Wheatland field	1,200 Mcf AF 1,450 psi/72 hrs. development Kantz Corners field	2,000 Mcf AF 1,400 psi/72 hrs. development Kantz Corners field	1,283 Mcf AF 1,500 psi/72 hrs. extension Lake pool Stoneboro field	1,100 Mcf AF 1,340 psi/48 hrs. development Wheatland field	786 Mcf AF 1,520 psi/72 hrs. development Kantz Corners field	980 Mcf AF 1,375 psi/48 hrs. development Sharon Deep pool field

Figure 36. (Continued).

COUNTY Permit Number	Mercer 085-20840	Mercer 085-20842	Mercer 085-20844	Mercer 085-20845	Mercer 085-20846	Mercer 085-20848	Mercer 085-20850	Potter 105-20991	Potter 105-20992	Potter 105-20993
NAME OF WELL	Albert Snyder #1	J. & J. Ouarterson #1	Elizabeth Bronich #1	J. S. Plawky #1	J. S. Plawky #2	Darlene Burdette #1	Joseph Michel #1-A	Tract 58 #RW-67	Tract 16 #RW-501	Tract 45 #RW-68
OPERATOR	Atlas Resources, Inc.	Atlas Resources, Inc.	Atlas Resources, Inc.	Atlas Resources, Inc.	Atlas Resources, Inc.	Cabot Oil and Gas Corporation	Cabot Oil and Gas Corporation	Consolidated Gas Transmission Corp.	Consolidated Gas Transmission Corp.	Consolidated Gas Transmission Corp.
TOWNSHIP	Hermitage	Hermitage	Hermitage	Hermitage	Hermitage	French Creek	Wolf Creek	Stewardson	Stewardson	Stewardson
QUADRANGLE	Sharon East	Sharon East	Sharon East	Sharon East	Sharon East	New Lebanon	Grove City	Oleona	Oleona	Oleona
LATITUDE	14,600 ft. S 41°15'00"	2,900 ft. S 41°12'30"	13,700 ft. S 41°15'00"	13,100 ft. S 41°15'00"	13,400 ft. S 41°15'00"	4,910 ft. S 41°30'00"	1,740 ft. S 41°12'30"	9,000 ft. S 41°32'30"	13,150 ft. S 41°32'30"	12,050 ft. S 41°32'30"
LONGITUDE	10,900 ft. W 80°22'30"	1,900 ft. W 80°27'30"	8,400 ft. W 80°22'30"	10,000 ft. W 80°22'30"	700 ft. W 80°25'00"	275 ft. W 80°00'00"	5,100 ft. W 80°00'00"	3,720 ft. W 77°40'00"	10,600 ft. W 77°40'00"	8,950 ft. W 77°40'00"
DATE COMPLETED	12-22-86	2-1-87	2-9-87	2-18-87	3-19-87	7-3-87	9-12-87	7-26-86	7-11-86	6-28-86
ELEVATION	1145 GR	1060 GR	1140 GR	1140 GR	1153 GR	1380 GR	1350 GR	1908 GR	1896 GR	1823 GR
LOGS RECEIVED AND LOGGED INTERVALS		COL/CNL: 89-5400 OLL/GR: 89-5400	COL/CNL: 0-5557 OLL/GR: 0-5557 PCL/GR: 4500-5500 INT: 5280-5518	COL/CNL: 0-5524 DLL/GR: 0-5524 PCL/GR: 4500-5508 INT: 5210-5500	COL/CNL: 0-5549 OLL/GR: 0-5549 INT: 5200-5530		CDL/CNL: 1026-6846	COL/CNL: 1028-6970 OLL/GR: 1028-6988	COL/CNL: 1028-6970 OLL/GR: 1028-6988	COL/CNL: 1020-6870 OLL/GR: 1020-6870
TULLY LIMESTONE	3160-	3160-	3367-	3390-	3369-	3568-	4223-	5766-	5812-	5752-
ONONDAGA LIMESTONE HUNTERSVILLE CHERT	3614-	3470-	3609-	3598-	3582-	3733-	4473-	6654-	6764-	6634-
ORISKANY SANDSTONE RIDGELEY SANDSTONE	3786-	3656-	3782-	3772-	3758-	3932-	4602-	6672-	6784-	6654-
SILURIAN-DEVONIAN CARBONATES	3814-	3676-	3808-	3796-	3780-	3962-	4613-	6710-	6834-	6696-
SALINA GROUP LOCKPORT DOLOMITE	3980- 4840-	3852- 4696-	3970- 4824-	3962- 4800-	3948- 4800-	4290- 4745-	4963- 5559-			
ROCHESTER SHALE IRONDEQUOIT DOLOMITE	5142- 5201-	5010- 5070-	5136- 5198-	5124- 5182-	5104- 5164-	5105- 5167-	5945- 5973-			
GRIMSBY FORMATION CABOT HEAD SHALE WHIRLPOOL SANDSTONE	5402- 5474-	5150- 5266- 5344-	5276- 5396- 5474-	5262- 5370- 5456-	5242- 5354- 5436-	5227- 5372- 5400-	6134- 6310-			
QUEENSTON FORMATION	5488-	5353-	5482-	5466-	5446-	5429-	6320-			
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina		Ridgeley	Ridgeley	Ridgeley
PRODUCING INTERVAL	5376-5485	5201-5291	5325-5408	5306-5380	5287-5444	5282-5312		6673-6689	6784-6808	6654-6680
TOTAL DEPTH	5558	5428	5557	5525	5550	5529	7006	6895	7010	6891
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Heiderberg	Heiderberg	Heiderberg
RESULTS	1,620 Mcf AF 1,400 psi/48 hrs. development Greenfield field	1,210 Mcf AF 1,325 psi/48 hrs. development Wheatland field	1,180 Mcf AF 1,250 psi/48 hrs. development Greenfield field	1,210 Mcf AF 1,350 psi/48 hrs. development Greenfield field	1,090 Mcf AF 1,300 psi/48 hrs. development Greenfield field	500 Mcf AF 1,170 psi/48 hrs. development Cochranston field	Plugged & abandoned development extension Irwin Wesley field	30,370 Mcf Nat. 3,030 psi/168 hrs. gas storage Greenlick Storage pool Leidy field	19,545 Mcf Nat. 3,550 psi/168 hrs. gas storage Greenlick Storage pool Leidy field	32,173 Mcf Nat. 3,030 psi/168 hrs. gas storage Greenlick Storage pool Leidy field

COUNTY Permit Number	Potter 105-20997	Somerset 111-20150	Somerset 111-20151	Somerset 111-20152	Somerset 111-20154	Somerset 111-20155	Somerset 111-20156	Somerset 111-20157	Tioga 117-20146	Tioga 117-20147
NAME OF WELL	Commonwealth of PA Tract 365 #3	A. Dupre #2	John Zborovancik #1	Stahl Unit #1	PA Tract #665 #2	Noah P. Summy #1	PA Game Commission TR-111A #2	A. Dupre #3	Arthur Dunbar #N-2003-S	Walter Smith #N-2004-S
OPERATOR	Stanley L. Grazis	CNG Development Company #1485	Berea Oil & Gas Corporation	Berea Oil & Gas Corporation	Berea Oil & Gas Corporation	Huntley & Huntley, Inc. #F01897	Doran & Associates, Inc. #KP-132	CNG Development Company #2540	Consolidated Gas Transmission Corp.	Consolidated Gas Transmission Corp.
TOWNSHIP	Abbott	Middlecreek	Somerset	Somerset	Jefferson	Greenville	Lower Turkeyfoot	Middlecreek	Chatham	Clymer
QUADRANGLE	Short Run	Seven Springs	Somerset	Bakersville	Seven Springs	Wittenburg	Mill Run	Seven Springs	Knoxville	Knoxville
LATITUDE	10,400 ft. S 41°37'30"	5,700 ft. S 40°02'30"	6,450 ft. S 40°02'30"	5,210 ft. S 40°02'30"	10,720 ft. S 40°05'00"	4,475 ft. S 39°47'30"	3,450 ft. S 39°55'00"	11,100 ft. S 40°02'30"	9,680 ft. S 41°55'00"	12,320 ft. S 41°55'00"
LONGITUDE	11,200 ft. W 77°45'00"	11,150 ft. W 79°15'00"	9,610 ft. W 79°00'00"	9,325 ft. W 79°07'30"	6,680 ft. W 79°15'00"	4,870 ft. W 78°57'30"	1,600 ft. S 79°22'30"	7,900 ft. S 79°15'00"	2,790 ft. W 77°27'30"	11,150 ft. W 77°27'30"
DATE COMPLETED	5-26-86	12-23-86	11-20-86	5-26-86	1-14-87	7-14-87	4-24-87	9-2-87	7-30-86	8-24-86
ELEVATION	1590 GR	2475 GR	2290 GR	2144 GR	2800 GR	2480 GR	2460 GR	2379 GR	1659 GR	1836 GR
LOGS RECEIVED AND LOGGED INTERVALS							COL/CNL: 0-8275 OLL/GR: 2098-8263 SON: 2098-8270 INT: 2450-8244		COL/CNL: 672-4704 OLL/GR: 672-4722	COL/CNL: 824-4683 OLL/GR: 830-4671
TULLY LIMESTONE	5298-	6640-	8150-		7540	5022-			3732-	3720-
ONONDAGA LIMESTONE HUNTERSVILLE CHERT	6117-	7744- 7750-	9238- 9260-	8758- 8780-	7784- 7808-	6012- 6056-	7947- 7974-	7924- 7939-	4576-	4494-
ORISKANY SANDSTONE RIDGELEY SANDSTONE	6141-	7860-	9378-	8892-	7955-	6111-	8117-	8105-	4537-	4508-
SILURIAN-DEVONIAN CARBONATES	6160-	7880-		9062-	8040-	6191-	8250-	8174-	4556-	4523-
SALINA GROUP LOCKPORT DOLOMITE										
ROCHESTER SHALE IRONDEQUOIT DOLOMITE										
GRIMSBY FORMATION CABOT HEAD SHALE WHIRLPOOL SANDSTONE										
QUEENSTON FORMATION										
PRODUCING FORMATION	Lock Haven			Ridgeley	Huntersville & Ridgeley		Huntersville & Ridgeley	Huntersville & Ridgeley	Ridgeley	Ridgeley
PRODUCING INTERVAL	4952			8898-8976	7816-7964		8040-8158	8010-8114	4537-4547	4508-4516
TOTAL DEPTH	6255	8020	9457	9154	8206	6306	8278	8329	4744	4700
DEEPEST FORMATION REACHED	Helderberg	Helderberg	Ridgeley	Helderberg	Helderberg	Shriver	Helderberg	Helderberg	Helderberg	Helderberg
RESULTS	100 Mof AF 2,550 psi/288 hrs. New pool discovery producing shallow Short Run pool Red Ridge field	Plugged and abandoned extension Seven Springs field	Plugged and abandoned New pool wildcat Somerset East field	222 Mof Nat. 984 Mof AF 3,520 psi/48 hrs. New pool discovery Levansville pool Bakersville field	8,420 Mof Nat. 4,750 Mof AF 3,222 psi/48 hrs. New pool discovery Lookout pool Seven Springs field	Plugged and abandoned New field wildcat	2,650 Mof AF New pool discovery Cranberry Lake pool Ontopyle field	1,732 Mof AF 3,350 psi/192 hrs. New pool discovery Ostillery pool Seven Springs field	6,850 Mof Nat. 15,460 Mof AF 1,865 psi/336 hrs. Gas Storage Sabinville Storage field	2,768 Mof AF 1,865 psi/336 hrs. Gas Storage Sabinville Storage field

Figure 36. (Continued).

COUNTY Permit Number	Venango 121-41330	Venango 121-41334	Venango 121-41991	Venango 121-41996	Venango 121-42067	Venango 121-42117	Venango 121-42151	Venango 121-42152	Venango 121-42156
NAME OF WELL	C. & I. Whitman #1	O. & D. Shaffer #1	Ralph A'Harrish #1	Howard Bloom #1	Servay-Ross #1	Edward Tecza #1	O. & R. Kohl #4	Darwin Bell #2	Weber-Speer Unit #1
OPERATOR	Mark Resources Corporation	Quaker State Oil Refining Corporation	Quaker State Oil Refining Corporation	Cabot Oil and Gas Corporation	Quaker State Oil Refining Corporation	Cabot Oil and Gas Corporation	Mark Resources Corporation	Cabot Oil and Gas Corporation	Mark Resources Corporation
TOWNSHIP	Jackson	Cherrytree	Cherrytree	Plum	Cherrytree	Cherrytree	Plum	Canal	Oakland
QUADRANGLE	Franklin	Titusville South	Titusville South	Dempseytown	Dempseytown	Titusville South	Dempseytown	Utica	Dempseytown
LATITUDE	7,650 ft. S 41°30'00"	1,000 ft. S 41°35'00"	10,900 ft. S 41°37'30"	9,670 ft. S 41°35'00"	7,250 ft. S 41°35'00"	1,890 ft. S 41°32'30"	14,950 ft. S 41°35'00"	1,020 ft. S 41°30'00"	13,300 ft. S 41°32'30"
LONGITUDE	10,700 ft. W 79°47'30"	11,050 ft. W 79°40'00"	9,600 ft. W 79°42'30"	3,050 ft. W 79°47'30"	1,750 ft. W 79°45'00"	6,360 ft. W 79°42'30"	9,000 ft. W 79°47'30"	8,020 ft. W 79°55'00"	8,350 ft. W 79°45'00"
DATE COMPLETED	7-12-85	10-18-85	3-4-86	3-21-86	1-29-87	7-4-86	7-4-87	10-22-86	10-17-86
ELEVATION	1500 GR	1275 GR	1480 GR	1232 GR	1360 GR	1495 GR	1385 GR	1495 GR	1435 GR
LOGS RECEIVED AND LOGGED INTERVALS	CDL/CNL: 640-5906 LL/GR: 640-5023 INT: 920-1400 PCL: 5600-5942			GR/PCL: 5000-5337		GR/PCL: 5400-5778		CDL/GR: 615-5654 LL/GR: 615-5643 GR/PCL: 5280-5594	DLL/GR: 50-5825 INT: 700-5780 GR/PCL: 5594-5703
TULLY LIMESTONE	3964-	3950-	3722-	3509-	3754-	3890-		3734-	3858-
ONONDAGA LIMESTONE HUNTERSVILLE CHERT	4204-	3672-	3981-	3756-	4010-	4153-	3880-	3964-	4106-
ORISKANY SANDSTONE RIDGELEY SANDSTONE	4328-	3812-	4113-	3886-	4135-	4273-	4010-	4096-	4224-
SILURIAN-DEVONIAN CARBONATES	4342-	3834-	4130-	3917-	4156-	4303-	4036-	4128-	4254-
SALINA GROUP LOCKPORT DOLOMITE	4474- 5212-	4460- 5130-	4273- 4922-	4232- 4641-	4311- 4990-	4624- 5083-	4188- 4842-	4240- 4992-	4370- 5132-
ROCHESTER SHALE IRONDEQUOIT DOLOMITE	5518- 5604-	4958- 5021-	5122- 5277-	5014- 5083-	5201- 5357-	5462- 5519-	5168- 5234-	5282- 5348-	5430- 5502-
GRIMSBY FORMATION CABOT HEAD SHALE WHIRLPOOL SANDSTONE	5674- 5796- 5842-	5138- 5190- 5248-	5375- 5466- 5500-	5145- 5275- 5310-	5419- 5541- 5585-	5583- 5720- 5743-	5342- 5392- 5460-	5380- 5550- 5587-	5570- 5707- 5740-
QUEENSTON FORMATION	5854-	5262-	5508-	5320-	5595-	5762-	5471-	5595-	5750-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	5714-5788	5598-5735	5465-5503	5179-5226	5462-5593	5635-5755	5347-5404	5446-5544	5594-5703
TOTAL DEPTH	5974	5900	5611	5390	5720	5822	5606	5661	5828
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	4,000 Mcf AF 1,480 psi/72 hrs. development Beatty Run pool Cooperstown field	900 Mcf AF 1,500 psi/72 hrs. development Beatty Run pool Cooperstown field	1,100 Mcf AF 1,175 psi/48 hrs. extension Gresham pool Breedtown field	550 Mcf AF 1,390 psi/48 hrs. development Beatty Run pool Cooperstown field	1,000 Mcf AF 1,290 psi/168 hrs. extension pool Hamilton Corners field	600 Mcf AF 1,100 psi/48 hrs. deeper pool discovery Tecza pool Hamilton Corners field	430 Mcf AF 1,435 psi/72 hrs. Beatty Run pool Cooperstown field	650 Mcf AF 1,320 psi/48 hrs. development Canal McCune Run field	360 Mcf AF 1,475 psi/72 hrs. extension Mt. Carmel pool Dempseytown field

COUNTY Permit Number	Venango 121-42160	Venango 121-42175	Venango 121-42177	Venango 121-42178	Venango 121-42179	Venango 121-42180	Venango 121-42182	Venango 121-42186	Venango 121-42187	Venango 121-42189
NAME OF WELL	Howard Cornell #1-A	Cubbon Lumber #1A	Harold Quinkle #1	M. & C. Iarr #1	Gonzalez-McClintock #1	H. J. DeWoody #1	J. W. Harris #1	Jerry Gongaware #1	D. & R. Kohl #5	Charles Newton #1
OPERATOR	Cabot Oil and Gas Corporation	Cabot Oil and Gas Corporation	Cabot Oil and Gas Corporation	Mark Resources Corporation	Mark Resources Corporation	Mark Resources Corporation	Mark Resources Corporation	Cabot Oil and Gas Corporation	Mark Resources Corporation	Cabot Oil and Gas Corporation
TOWNSHIP	Cherrytree	Jackson	Oakland	Oakland	Oakland	Oakland	Oakland	Canal	Oakland	Canal
QUADRANGLE	Titusville South	Utica	Dempseytown	Titusville South	Titusville South	Dempseytown	Dempseytown	Utica	Dempseytown	Utica
LATITUDE	4,435 ft. S 41°32'30"	11,715 ft. S 41°30'00"	15,070 ft. S 41°32'30"	10,200 ft. S 41°32'30"	6,650 ft. S 41°32'30"	9,000 ft. S 41°32'30"	4,100 ft. S 41°32'30"	2,710 ft. S 41°30'00"	3,050 ft. S 41°32'30"	45 ft. S 41°30'00"
LONGITUDE	9,810 ft. W 79°42'30"	1,210 ft. W 79°52'30"	7,100 ft. W 79°47'30"	8,250 ft. W 79°42'30"	8,150 ft. W 79°42'30"	10,850 ft. W 79°45'00"	3,650 ft. W 79°45'00"	6,635 ft. W 79°57'30"	1,850 ft. W 79°47'30"	6,195 ft. W 79°55'00"
DATE COMPLETED	10-6-86	11-11-86	11-1-86	11-19-86	10-28-86	11-7-86	11-12-86	11-21-86	11-23-86	11-30-86
ELEVATION	1580 GR	1270 GR	1335 GR	1491 GR	1590 GR	1498 GR	1471 GR	1523 GR	1249 GR	1558 GR
LOGS RECEIVED AND LOGGED INTERVALS	GR/PCL: 5600-5889			COL/CNL: 0-5884 OLL/GR: 0-5884 INT: 800-5836 PCL: 5800-5802		COL/CNL: 0-5818 OLL/GR: 0-5818 INT: 800-5778 GR/PCL: 5400-5743	COL/CNL: 0-5772 OLL/GR: 0-5772 INT: 760-5750 GR/PCL: 5500-5710		COL/CNL: 0-5514 OLL/GR: 0-5514 INT: 3800-5500 GR/PCL: 5250-5460	
TULLY LIMESTONE	3970-	3682-	3738-	3912-	4002-	3852-	3814-	3727-	3566-	3790-
ONONDAGA LIMESTONE HUNTERSVILLE CHERT	4229-	3904-	3980-	4174-	4262-	4098-	4068-	3900-	3812-	4019-
ORISKANY SANDSTONE RIDGELEY SANDSTONE	4351-	4031-	4105-	4292-	4381-	4222-	4194-	4092-	3938-	4153-
SILURIAN-DEVONIAN CARBONATES	4373-	4061-	4132-	4320-	4406-	4252-	4218-	4023-	3966-	4190-
SALINA GROUP LOCKPORT DOLOMITE	4700- 5182-	4402- 4873-	4464- 4943-	4436- 5168-	4576- 5296-	4358- 5100-	4322- 5056-	4449- 4910-	4068- 4780-	4441- 4970-
ROCHESTER SHALE IRONDEQUOIT DOLOMITE	5557- 5662-	5262- 5307-	5310- 5377-	5504- 5560-	5586- 5648-	5414- 5484-	5372- 5448-	5282- 5343-	5106- 5172-	5334- 5397-
GRIMSBY FORMATION CABOT HEAD SHALE WHIRLPOOL SANDSTONE	5677- 5813- 5842-	5375- 5560- 5547-	5443- 5578- 5609-	5626- 5768- 5796-	5760- 5820- 5880-	5532- 5686- 5716-	5512- 5648- 5678-	5400- 5550- 5579-	5237- 5368- 5404-	5455- 5597- 5632-
QUEENSTON FORMATION	5854-	5561-	5624-	5808-	5892-	5730-	5688-	5592-	5414-	5643-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	5737-5850	5443-5458	5490-5508	5695-5746	5748-5836	5592-5660	5560-5628	5445-5475	5281-5357	5501-5523
TOTAL DEPTH	5915	5609	5688	5900	5980	5825	5773	5657	5530	571-
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	500 McF AF 1,170 psi/48 hrs. extension Tea Hamilton Corners field	600 McF AF 1,220 psi/48 hrs. development Beatty Run pool Cooperstown field	600 McF AF 1,260 psi/48 hrs. development Beatty Run pool Cooperstown field	120 McF AF 1,400 psi/72 hrs. development Spiane pool Oakland field	160 McF AF 1,350 psi/72 hrs. extension Spiane pool Oakland field	106 McF AF 1,410 psi/72 hrs. development Mt. Carmel pool Dempseytown field	90 McF AF 1,410 psi/72 hrs. development Mt. Carmel pool Dempseytown field	550 McF AF 1,225 psi/48 hrs. development Cohamton field	95 McF AF 1,450 psi/72 hrs. development Beatty Run pool Cooperstown field	500 McF AF 1,200 psi/48 hrs. development Canal pool McIntosh Run field

Figure 36. (Continued).

COUNTY Permit Number	Venango 121-42193	Venango 121-42194	Venango 121-42204	Venango 121-42205	Venango 121-42206	Venango 121-42209	Venango 121-42241	Venango 121-42242	Venango 121-42243	Venango 121-42245
NAME OF WELL	D. & R. Kohl #9	D. & R. Kohl #6	D. & R. Kohl #7	Earl Bell #1	Edward Gavrys #1	A. J. Rishel #1	Harold Sitterly #1	O. S. Benson #2	Gustav Sauerland #2	John Ruba #1
OPERATOR	Mark Resources Corporation	Mark Resources Corporation	Mark Resources Corporation	Quaker State Oil Refining Corporation	Quaker State Resources Corp.	Mark Resources Corporation	Cabot Oil and Gas Corporation	Cabot Oil and Gas Corporation	Cabot Oil and Gas Corporation	Cabot Oil and Gas Corporation
TOWNSHIP	Plum	Plum	Plum	Cherrytree	Cherrytree	Oakland	Plum	Oakland	Plum	Cherrytree
QUAD/PANGLE	Oempseytown	Oempseytown	Oempseytown	Titusville South	Titusville South	Oempseytown	Oempseytown	Oempseytown	Oempseytown	Oempseytown
LATITUDE	600 ft. S 41°32'30"	2,400 ft. S 41°32'30"	14,500 ft. S 41°35'00"	11,270 ft. S 41°35'00"	2,860 ft. S 41°35'00"	14,820 ft. S 41°35'00"	11,900 ft. S 41°35'00"	14,750 ft. S 41°35'30"	690 ft. S 41°35'00"	9,750 ft. S 41°37'30"
LONGITUDE	4,700 ft. W 79°47'30"	4,800 ft. W 79°47'30"	6,100 ft. W 79°47'30"	10,720 ft. W 79°40'00"	9,810 ft. W 79°42'30"	10,230 ft. W 79°45'00"	11,250 ft. W 79°47'30"	10,520 ft. W 79°47'30"	6,510 ft. W 79°47'30"	4,740 ft. W 79°42'00"
DATE COMPLETED	12-13-86	1-3-87	2-1-87	2-26-87	2-10-87	7-15-87	6-3-87	6-5-87	5-8-87	5-16-87
ELEVATION	1279 GR	1257 GR	1385 GR	1520 GR	1540 GR	1409 GR	1452 GR	1533 GR	1514 GR	1525 GR
LOGS RECEIVED AND LOGGED INTERVALS	COL/CNL: 0-5536	COL/CNL: 0-5473	COL/CNL: 0-5570				PCL: 5180-5510	GR/PCL: 5500-5820	PCL: 5130-5473	PCL: 5180-5490
TULLY LIMESTONE	3564-	3540-	3562-	3905-	3865-	3728-	3696-	3913-	3721-	3730-
ONONDAGA LIMESTONE HUNTERSVILLE CHERT	3810-	3786-	3894-	4169-	4119-	3978-	3932-	4153-	3958-	3982-
ORISKANY SANDSTONE RIDGELEY SANDSTONE	3938-	3914-	4026-	4286-	4265-	4107-	4065-	4280-	4099-	4120-
SILURIAN-DEVONIAN CARBONATES	3964-	3946-	4040-	4304-	4276-	4128-	4094-	4284-	4128-	4148-
SALINA GROUP LOCKPORT DOLOMITE	4120- 4782-	4042- 4772-	4150- 4858-	4470- 5166-	4448- 5046-	4290- 4956-	4404- 4893-	4644- 5124-	4420- 4836-	4444- 4832-
ROCHESTER SHALE IRONDEQUOIT DOLOMITE	5104- 5170-	5084- 5150-	5180- 5248-	5383- 5540-	5300- 5436-	5278- 5346-	5197- 5268-	5482- 5556-	5193- 5264-	5192- 5258-
GRIMSBY FORMATION CABOT HEAD SHALE WHIRLPOOL SANDSTONE	5238- 5368- 5396-	5216- 5348- 5360-	5312- 5448- 5476-	5604- 5735- 5770-	5504- 5618- 5660-	5453- 5520- 5572-	5332- 5481- 5495-	5623- 5762- 5791-	5322- 5454- 5488-	5316- 5448- 5484-
QUEENSTON FORMATION	5410-	5390-	5484-	5782-	5670-	5583-	5504-	5804-	5498-	5492-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	5281-5325	5270-5335	5354-5415	5610-5780	5536-5667	5459-5539	5390-5402	5668-5701	5364-5400	5353-5399
TOTAL DEPTH	5550	5495	5590	5881	5785	5685	5580	5860	5498	5543
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	390 Mcf AF 1,475 psi/72 hrs. development Beatty Run pool Cooperstown field	147 Mcf AF 1,450 psi/72 hrs. development Beatty Run pool Cooperstown field	80 Mcf AF 1,450 psi/72 hrs. development Beatty Run pool Cooperstown field	800 Mcf AF 1,125 psi/168 hrs. discovery Cherrytree Run pool Toonerville field	800 Mcf AF 1,100 psi/96 hrs. development Beatty Run pool Hamilton Corners field	170 Mcf AF 1,425 psi/72 hrs. development Beatty Run pool Cooperstown field	650 Mcf AF 1,160 psi/48 hrs. development Beatty Run pool Cooperstown field	650 Mcf AF 1,240 psi/48 hrs. development Beatty Run pool Cooperstown field	550 Mcf AF 1,375 psi/48 hrs. development Beatty Run pool Cooperstown field	600 Mcf AF 1,390 psi/48 hrs. extension Gresham pool Breedtown field

SUMMARIZED RECORDS OF DEEP WELLS

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COUNTY Permit Number	Venango 121-42246	Venango 121-42247	Venango 121-42249	Venango 121-42253	Venango 121-42254	Venango 121-42259	Venango 121-42261	Venango 121-42262	Venango 121-42265	Venango 121-42266
NAME OF WELL	Harry Krepps #1	Harold Proper #1	Darwin Bell #3	Earl Kauffman #1	Joseph Madden #1	James Wilson #1	George Menalko #1	George May #1	Andrew Keeley #2	Clifton Deeter #2
OPERATOR	Cabot Oil and Gas Corporation	Cabot Oil and Gas Corporation	Cabot Oil and Gas Corporation	Cabot Oil and Gas Corporation	Cabot Oil and Gas Corporation	Cabot Oil and Gas Corporation	Cabot Oil and Gas Corporation	Cabot Oil and Gas Corporation	Cabot Oil and Gas Corporation	Cabot Oil and Gas Corporation
TOWNSHIP	Plum	Plum	Canal	Oakland	Plum	Plum	Plum	Oakland	Jackson	Canal
QUADRANGLE	Dempseystown	Dempseystown	Utica	Dempseystown	Dempseystown	Dempseystown	Dempseystown	Dempseystown	Dempseystown	Utica
LATITUDE	13,940 ft. S 41°37'30"	1,770 ft. S 41°37'30"	13,930 ft. S 41°30'00"	8,695 ft. S 41°32'30"	3,690 ft. S 41°35'00"	3,200 ft. S 41°35'00"	10,380 ft. S 41°37'30"	10,620 ft. S 41°32'30"	120 ft. S 41°32'30"	9,950 ft. S 41°30'00"
LONGITUDE	9,320 ft. W 79°47'30"	10,550 ft. W 79°45'00"	10,190 ft. W 79°55'00"	1,055 ft. W 79°45'00"	10,420 ft. W 79°50'00"	6,890 ft. W 79°50'00"	9,100 ft. W 79°47'30"	2,790 ft. W 79°47'30"	11,320 ft. W 79°50'00"	1,070 ft. W 79°57'30"
DATE COMPLETED	8-26-87	6-21-87	6-20-87	5-24-87	5-27-87	5-18-87	8-22-87	6-14-87	5-30-87	6-8-87
ELEVATION	1575 GR	1505 GR	1330 GR	1541 GR	1402 GR	1292 GR	1553 GR	1410 GR	1480 GR	1260 GR
LOGS RECEIVED AND LOGGED INTERVALS	PCL: 5098-5814	PCL: 5222-5505	PCL: 5222-5505	PCL: 5098-5814	PCL: 4990-5341	PCL: 4900-5228	PCL: 5120-5453	PCL: 5360-5676	PCL: 5193-5417	GR/PCL: 0-5403
TULLY LIMESTONE	3744-	3631-	3645-	3995-	3537-	3403-	3700-	3785-	3688-	3542-
ONONDAGA LIMESTONE HUNTERSVILLE CHERT	3980-	3873-	3871-	4204-	3752-	3632-	3933-	4029-	3917-	3770-
ONISKANY SANDSTONE RIDGELEY SANDSTONE	4120-	4029-	4014-	4319-	3894-	3773-	4076-	4152-	4056-	3916-
SILURIAN-DEVONIAN CARBONATES	4150-	4051-	4039-	4344-	3919-	3806-	4154-	4182-	4083-	3943-
SALINA GROUP LOCKPORT DOLOMITE	4448- 4872-	4344- 4744-	4380- 4844-	4682- 5164-	4218- 4670-	4107- 4534-	4407- 4803-	4512- 4990-	4395- 4852-	4279- 4747-
ROCHESTER SHALE IRONDEQUOIT DOLOMITE	5232- 5282-	5102- 5163-	5202- 5259-	5538- 5596-	5053- 5091-	4896- 4960-	5176- 5236-	5345- 5414-	5210- 5272-	5097- 5162-
GRIMSBY FORMATION CABOT HEAD SHALE WHIRLPOOL SANDSTONE	5352- 5386- 5514-	5220- 5352- 5384-	5328- 5475- 5511-	5665- 5655- 5878-	5150- 5287- 5315-	5019- 5152- 5185-	5295- 5432- 5462-	5480- 5618- 5648-	5331- 5468- 5500-	5219- 5374- 5402-
QUEENSTON FORMATION	5526-	5395-	5520-	5889-	5329-	5196-	5472-	5660-	5513-	5418-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	5395-5418	5280-5299	5377-5400	5873	5209-5234	5069-5091	5329-5377	5531-5552	5367-5396	5279-5309
TOTAL DEPTH	5560	5456	5590	5873	5390	5261	5505	5715	5570	5453
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	1,726 Mcf AF 1,110 psi/48 hrs. extension Beatty Run pool Cooperstown field	550 Mcf AF 1,260 psi/48 hrs. extension Gresham pool Breedtown field	600 Mcf AF 1,240 psi/48 hrs. development Canal pool McCine Run field	Plugged and abandoned extension McCine pool Dempseystown field	550 Mcf AF 1,300 psi/48 hrs. development Wilson Hills pool Lake Creek field	650 Mcf AF 1,260 psi/48 hrs. development Beatty Run pool Cooperstown field	650 Mcf AF 1,060 psi/48 hrs. development Beatty Run pool Cooperstown field	650 Mcf AF 1,060 psi/48 hrs. development Beatty Run pool Cooperstown field	600 Mcf AF 1,340 psi/48 hrs. development Beatty Run pool Cooperstown field	540 Mcf AF 1,310 psi/48 hrs. development Canal pool McCine Run field

Figure 36. (Continued).

COUNTY Permit Number	Venango 121-42267	Venango 121-42274	Venango 121-42276	Venango 121-42278	Venango 121-42281	Venango 121-42282	Venango 121-42283	Venango 121-42284	Venango 121-42286	Venango 121-42293
NAME OF WELL	Frank Wright #1	Elmer Brown #6	William Miller #1	Curtis Wood #1	Larry Williams #1	K. & D. Millet #1	White-Bargar Unit #1	George Widion #1	Charles Lee #1	Shirley Carroll #1
OPERATOR	Cabot Oil and Gas Corporation	Cabot Oil and Gas Corporation	Cabot Oil and Gas Corporation	Cabot Oil and Gas Corporation	Cabot Oil and Gas Corporation	Cabot Oil and Gas Corporation	Cabot Oil and Gas Corporation	Cabot Oil and Gas Corporation	Cabot Oil and Gas Corporation	Cabot Oil and Gas Corporation
TOWNSHIP	Plum	Jackson	Plum	Canal	Jackson	Dakland	Dakland	Canal	Jackson	Canal
QUADRANGLE	Dempseytown	Sugar Lake	Dempseytown	Utica	Sugar Lake	Dempseytown	Dempseytown	Sugar Lake	Dempseytown	Utica
LATITUDE	1,320 ft. S 41°32'30"	10,580 ft. S 41°35'00"	1,130 ft. S 41°35'00"	14,020 ft. S 41°30'00"	1,160 ft. S 41°32'30"	11,050 ft. S 41°32'30"	2,750 ft. S 41°32'30"	13,210 ft. S 41°32'30"	10,390 ft. S 41°32'30"	6,140 ft. S 41°30'00"
LONGITUDE	2,050 ft. W 79°50'00"	8,000 ft. W 79°52'30"	5,700 ft. W 79°50'00"	1,920 ft. W 79°55'00"	5,280 ft. W 79°52'30"	10,700 ft. W 79°45'00"	6,350 ft. W 79°45'00"	1,780 ft. W 79°55'00"	3,180 ft. W 79°50'00"	4,390 ft. W 79°57'30"
DATE COMPLETED	7-16-87	6-11-87	6-13-87	7-1-87	6-24-87	6-14-87	6-23-87	7-29-87	6-15-87	7-26-87
ELEVATION	1473 GR	1470 GR	1410 GR	1170 GR	1331 GR	1470 GR	1390 GR	1497 GR	1145 GR	1448 GR
LOGS RECEIVED AND LOGGED INTERVALS		GR/PCL: 3800-5425	PCL: 5020-5339	PCL: 5105-5404	GR/PCL: 5050-5378				PCL: 5220-5542	
TULLY LIMESTONE	3727-	2612-	3544-	3552-	3536-	3826-	3738-	3755-	3473-	3674-
ONONDAGA LIMESTONE HUNTERSVILLE CHERT	3960-	3834-	3774-	3762-	3760-	4075-	3990-	3973-	3708-	3894-
ORISKANY SANDSTONE RIDGELEY SANDSTONE	4092-	3979-	3916-	3900-	3902-	4201-	4115-	4016-	3842-	4038-
SILURIAN-DEVONIAN CARBONATES	4122-	4013-	3944-	3928-	3930-	4216-	4132-	4139-	3870-	4068-
SALINA GROUP LOCKPORT DOLOMITE	4444- 4898-	4102- 4781-	4250- 4677-	4264- 4738-	4238- 4698-	4395- 5072-	4303- 4972-	4460- 4920-	4190- 4670-	4398- 4870-
ROCHESTER SHALE IRONDEQUOIT DOLOMITE	5258- 5321-	5101- 5160-	5046- 5098-	5090- 5158-	5052- 5118-	5390- 5466-	5294- 5364-	5280- 5344-	5027- 5095-	5230- 5246-
GRIMSBY FORMATION CABOT HEAD SHALE WHIRLPOOL SANDSTONE	5386- 5517- 5550-	5190- 5355- 5386-	5157- 5289- 5320-	5226- 5370- 5398-	5178- 5312- 5344-	5580- 5642- 5698-	5467- 5540- 5590-	5404- 5544- 5571-	5162- 5294- 5325-	5354- 5506- 5538-
QUEENSTON FORMATION	5562-	5402-	5333-	5415-	5360-	5710-	5603-	5590-	5339-	5550-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina		Medina
PRODUCING INTERVAL	5438-5464	5276-5293	5207-5232	5272-5291	5229-5256	5580-5655	5472-5544	5308-5448		5418-5443
TOTAL DEPTH	5635	5480	5402	5475	5440	5829	5647	5648	5400	5584
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	650 Mcf AF 1,340 psi/48 hrs. development Beatty Run pool Cooperstown field	650 Mcf AF 1,180 psi/48 hrs. development Wilson Mills pool Lake Creek field	600 Mcf AF 1,235 psi/48 hrs. development Beatty Run pool Cooperstown field	600 Mcf AF 1,390 psi/48 hrs. development Takitezy pool Sugar Creek field	Shov of gas development Beatty Run pool Cooperstown field	120 Mcf AF 1,475 psi/72 hrs. development Mt. Carmel pool Dempseytown field	1,470 Mcf AF extension pool Hamil Corners field	600 Mcf AF development Beatty Run pool Cooperstown field	Plugged and abandoned development Beatty Run pool Cooperstown field	600 Mcf AF 1,350 psi/48 hrs. development Beatty Run pool Cooperstown field

COUNTY Permit Number	Venango 121-42395	Venango 121-42396	Venango 121-42397	Venango 121-42302	Venango 121-42303	Venango 121-42304	Venango 121-42306	Venango 121-42307	Venango 121-42308	Venango 121-42316
NAME OF WELL	Willard Glover #4	Howard Cornell #2	Arthur Oeeter #1	Coyne-Slagle Unit #1	Lester Reitz #1	Willard Glover Unit #2	Lewis Panion #1	W. Glover #3-A	L. & L. Snyder #1	Donald Fenstermaker #1
OPERATOR	Cabot Oil and Gas Corporation	Cabot Oil and Gas Corporation	Cabot Oil and Gas Corporation	Mark Resources Corporation	Cabot Oil and Gas Corporation	Cabot Oil and Gas Corporation	Cabot Oil and Gas Corporation	Cabot Oil and Gas Corporation	Mark Resources Corporation	Cabot Oil and Gas Corporation
TOWNSHIP	Plum	Cherrytree	Canal	Dakland	Dakland	Plum	Plum	Plum	Sugar Creek	Cherrytree
QUADRANGLE	Oempseytown	Titusville South	Sugar Lake	Oempseytown	Oempseytown	Deepseytown	Deepseytown	Oempseytown	Utica	Oempseytown
LATITUDE	10.810 ft. S 41°35'00"	4.810 ft. S 41°32'30"	11.300 ft. S 41°32'30"	6.200 ft. S 41°32'30"	12.910 ft. S 41°32'30"	11.735 ft. S 41°35'00"	6.425 ft. S 41°37'30"	9.070 ft. S 41°35'00"	12.200 ft. S 41°30'00"	1.250 ft. S 41°35'00"
LONGITUDE	10.045 ft. W 79°45'00"	7.780 ft. W 79°42'30"	8.350 ft. W 79°55'00"	9.150 ft. W 79°45'00"	7.695 ft. W 79°47'30"	290 ft. W 79°47'30"	5.450 ft. W 79°45'00"	10.145 ft. W 79°45'00"	5.800 ft. W 79°52'30"	500 ft. W 79°45'00"
DATE COMPLETED	7-2-87	7-27-87	7-17-87	7-13-87	7-4-87	7-16-87	8-14-87	7-26-87	8-14-87	8-29-87
ELEVATION	1280 GR	1506 GR	1582 GR	1292 GR	1329 GR	1279 GR	1588 GR	1240 GR	1112 GR	1395 GR
LOGS RECEIVED AND LOGGED INTERVALS	COL/GR: 0-5444				PCL: 5247-5599					
TULLY LIMESTONE	3588-	3906-	3777-	3640-	3701-	3556-	3769-	3549-	3504-	3667-
ONONDAGA LIMESTONE HUNTERSVILLE CHERT	3839-	4168-	4002-	3890-	3940-	3806-	4020-	3795-	3721-	3922-
ORISKANY SANDSTONE RIDGELEY SANDSTONE	3964-	4287-	4140-	4014-	4064-	3934-	4160-	3931-	3852-	4050-
SILURIAN-DEVONIAN CARBONATES	4000-	4312-	4172-	4032-	4095-	3965-	4190-	3961-	3884-	4077-
SALINA GROUP LOCKPORT DOLOMITE	4090- 4876-	4640- 5116-	4440- 4964-	4204- 4884-	4430- 4902-	4276- 4735-	4486- 4883-	4278- 4704-	4060- 4738-	4390- 4802-
ROCHESTER SHALE IRONDEQUOIT DOLOMITE	5114- 5184-	5466- 5548-	5324- 5386-	5202- 5270-	5264- 5328-	5090- 5156-	5246- 5305-	5060- 5126-	5066- 5130-	5112- 5230-
GRIMSBY FORMATION CABOT HEAD SHALE WHIRLPOOL SANDSTONE	5244- 5364- 5412-	5615- 5752- 5783-	5444- 5588- 5619-	5378- 5438- 5492-	5394- 5534- 5563-	5221- 5352- 5384-	5364- 5499- 5429-	5189- 5332- 5353-	5258- 5314- 5370-	5290- 5424- 5465-
QUEENSTON FORMATION	5421-	5792-	5636-	5512-	5574-	5396-	5440-	5367-	5384-	5475-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	5306-5336	5666-5681	5483-5496	5383-5464	5438-5466	5275-5303	5410-5438	5261-5280	5265-5334	5326-5352
TOTAL DEPTH	5496	5845	5708	5636	5640	5452	5605	5455	5437	5535
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	650 Mcf AF 1,275 psi/48 hrs. development Beatty Run pool Cooperstown field	550 Mcf AF 1,300 psi/48 hrs. development Hamilton Corners pool field	500 Mcf AF 1,250 psi/48 hrs. development Canal pool McQuinn Run field	145 Mcf AF 1,425 psi/72 hrs. development Mt. Carmel pool Oempseytown field	650 Mcf AF 1,290 psi/48 hrs. development Beatty Run pool Cooperstown field	550 Mcf AF 1,375 psi/48 hrs. development Beatty Run pool Cooperstown field	650 Mcf AF 1,050 psi/48 hrs. development Graham pool Breedtown field	550 Mcf AF 1,240 psi/48 hrs. development Beatty Run pool Cooperstown field	206 Mcf AF 1,450 psi/72 hrs. development Tskitazy pool Sugar Creek-Niles field	650 Mcf AF 1,340 psi/48 hrs. development external Teeza pool Hamilton Corners field

Figure 36. (Continued).

COUNTY Permit Number	Venango 121-42317	Venango 121-42318	Venango 121-42319	Venango 121-42323	Venango 121-42325	Venango 121-42326	Venango 121-42332	Venango 121-42336	Venango 121-42344	Venango 121-42345	
NAME OF WELL	Harry Krepps #2	Steven Rensma #1-A	H. Barger #1	Oavid Hall #1	John Grove #1	Larry Bell #1	Ronald Black #1	J. L. Orost #1	Donald Sheffer #1A	Leonard Grajek #1	
OPERATOR	Cabot Oil and Gas Corporation	Cabot Oil and Gas Corporation	Cabot Oil and Gas Corporation	Cabot Oil and Gas Corporation	Cabot Oil and Gas Corporation	Cabot Oil and Gas Corporation	Cabot Oil and Gas Corporation	Mark Resources Corporation	Cabot Oil and Gas Corporation	Cabot Oil and Gas Corporation	
TOWNSHIP	Plum	Jackson	Dakland	Canal	Jackson	Canal	Dakland	Jackson	Canal	Canal	
QUADRANGLE	Oempseytown	Sugar Lake	Oempseytown	Utica	Franklin	Utica	Oempseytown	Franklin	Utica	Utica	
LATITUDE	600 ft. S 41°35'00"	9,120 ft. S 41°32'30"	9,580 ft. S 41°32'30"	2,600 ft. S 41°27'30"	7,020 ft. S 41°30'00"	13,150 ft. S 41°30'00"	12,300 ft. S 41°32'30"	6,820 ft. S 41°30'00"	15,080 ft. S 41°30'00"	8,650 ft. S 41°30'00"	
LONGITUDE	10,380 ft. W 79°47'30"	8,480 ft. W 79°52'30"	920 ft. W 79°47'30"	3,770 ft. W 79°55'00"	5,430 ft. W 79°50'00"	400 ft. W 79°57'30"	9,740 ft. W 79°47'30"	11,090 ft. W 79°50'00"	3,370 ft. W 79°57'30"	2,700 ft. W 79°57'30"	
DATE COMPLETED	8-5-87	8-8-87	9-3-87	8-5-87	8-8-87	8-18-87	8-23-87	9-1-87	8-26-87	9-6-87	
ELEVATION	1520 GR	1427 GR	1490 GR	1362 GR	1269 GR	1250 GR	1415 GR	1115 GR	1205 GR	1240 GR	
LOGS RECEIVED AND LOGGED INTERVALS	PCL: 5200-5499		PCL: 5500-5756	PCL: 5300-5628	PCL: 5243-5553		PCL: 5372-5680				
TULLY LIMESTONE	3695-	3664-	3862-	3769-	3624-	3560-	3778-	3482-	3506-	3496-	
ONONDAGA LIMESTONE HUNTERSVILLE CHERT	3929-	3887-	4108-	3980-	3908-	3786-	4018-	3706-	3731-	3720-	
ORISKANY SANDSTONE RIOGLEY SANDSTONE	4067-	4025-	4235-	4108-	4038-	3926-	4145-	3836-	3870-	3862-	
SILURIAN-DEVONIAN CARBONATES	4100-	4056-	4265-	4136-	4070-	3958-	4170-	3868-	3904-	3892-	
SALINA GROUP LOCKPORT DOLOMITE	4402- 4816-	4370- 4830-	4586- 5066-	4472- 4942-	4458- 4876-	4293- 4760-	4504- 4971-	4042- 4710-	4240- 4710-	4226- 4692-	
ROCHESTER SHALE IRONDEQUOIT DOLOMITE	5177- 5242-	5193- 5259-	5422- 5494-	5310- 5370-	5241- 5302-	5118- 5186-	5337- 5401-	5042- 5100-	5070- 5138-	5060- 5108-	
GRIMSBY FORMATION CABOT HEAD SHALE WHIRLPOOL SANDSTONE	5302- 5406- 5453-	5320- 5460- 5492-	5562- 5690- 5728-	5448- 5590- 5618-	5374- 5508- 5536-	5248- 5308- 5426-	5467- 5537- 5634-	5202- 5272- 5350-	5211- 5350- 5404-	5176- 5324- 5356-	
QUEENSTON FORMATION	5478-	5512-	5742-	5631-	5556-	5442-	5654-	5354-	5414-	5361-	
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	
PRODUCING INTERVAL	5343-5380	5369-5398	5602-5620	5496-5512	5418-5449	5290-5318	5511-5550	5224-5290	5249-5274	5220-5253	
TOTAL DEPTH	5560	5590	5797	5693	5617	5509	5745	5480	5447	5436	
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	
RESULTS	650 Mcf AF 1,475 psi/48 hrs. development Beatty Run pool Cooperstown field	600 Mcf AF 1,040 psi/48 hrs. development Beatty Run pool Cooperstown field	600 Mcf AF 950 psi/48 hrs. development Beatty Run pool Cooperstown field	600 Mcf AF 1,100 psi/48 hrs. development Takitezy pool Sugar Creek-Niles field	IP not reported 1,260 psi/48 hrs. development Beatty Run pool Cooperstown field	500 Mcf AF 1,300 psi/48 hrs. development Canal pool McCune Run field	550 Mcf AF 1,475 psi/48 hrs. development Beatty Run pool Cooperstown field	550 Mcf AF 1,475 psi/48 hrs. development Beatty Run pool Cooperstown field	250 Mcf AF 1,470 psi/72 hrs. development Beatty Run pool Cooperstown field	550 Mcf AF 1,330 psi/48 hrs. development Canal pool McCune Run field	600 Mcf AF 1,200 psi/48 hrs. development Canal pool McCune Run field

COUNTY Permit Number	Venango 121-42346	Venango 121-42360	Venango 121-42369	Warren 123-29261	Warren 123-34435	Warren 123-35683	Warren 123-37653	Warren 123-37663	Warren 123-37664	Warren 123-37665
NAME OF WELL	Glenn Clinger, Jr. #1	Ernest Pardee #2	Jack Harter #1	Edward Kuzminski #1	Aronie Bunker #042	Lauger-Toplovich Estate #1	Nick Burik #1	Siggins #1	Philadelphia Grove #1	Philadelphia Grove #2
OPERATOR	Cabot Oil and Gas Corporation	Cabot Oil and Gas Corporation	Cabot Oil and Gas Corporation	Natural Resources Management Corp.	Quaker State Resources Corp.	U. S. Energy Development Corp.	N.E.A. Cross Company	Quaker State Oil Refining Corporation	Quaker State Oil Refining Corporation	Quaker State Oil Refining Corporation
TOWNSHIP	Oakland	Canal	Plum	Farmington	Watson	Columbus	Columbus	Triumph	Southwest	Southwest
QUADRANGLE	Oempseystown	Utica	Dempseystown	Russell	Warren	Columbus	Columbus	Tidiloute	Grand Valley	Grand Valley
LATITUDE	11,320 ft. S 41°32'30"	7,790 ft. S 41°30'00"	12,100 ft. S 41°35'00"	600 ft. S 41°57'30"	11,400 ft. S 41°47'30"	7,600 ft. S 42°00'00"	10,100 ft. S 41°57'30"	5,050 ft. S 41°42'30"	1,175 ft. S 41°42'30"	2,525 ft. S 41°42'30"
LONGITUDE	6,700 ft. W 79°47'30"	780 ft. W 79°55'00"	2,350 ft. W 79°47'30"	6,900 ft. W 79°12'30"	1,900 ft. W 79°12'30"	10,500 ft. W 79°30'00"	6,900 ft. W 79°32'30"	9,500 ft. W 79°27'30"	5,750 ft. W 79°30'00"	4,500 ft. W 79°30'00"
DATE COMPLETED	9-3-87	9-16-87	9-14-87	7-21-81	1-31-84	10-11-84	8-19-85	1-1-86	6-9-85	12-20-85
ELEVATION	1240 GR	1435 GR	1265 GR	1890 GR	1865 GR	1478 GR	1575 GR	1630 GR	1700 GR	1605 GR
LOGS RECEIVED AND LOGGED INTERVALS						COL/CNL: 2650-4440 OIL/GR: 2650-4400	COL/GR: 2647-4681	COL/CNL: 0-5756 GO/GR: 900-5756 INT: 5400-5756		COL/CNL: 0-5625 OIL/GR: 950-5625 INT: 5360-5560
TULLY LIMESTONE	3611-	3764-	3548-	3412-	4196-	2699-	2954-	3890-	3906-	3821-
ONONDAGA LIMESTONE HUNTERSVILLE CHERT	3852-	3984-	3798-	3648-	4503-	2978-	3232-	4176-	4196-	4112-
ONISKANY SANDSTONE ROGEELEY SANDSTONE	3978-	4122-	3931-	3707- Bois Blanc	4570-				4306-	4212-
SILURIAN-DEVONIAN CARBONATES	4010-	4163-	3965-	3794-	4582-	3156-	3396-	4268-	4325-	4237-
SALINA GROUP LOCKPORT DOLOMITE	4336- 4812-	4490- 4955-	4276- 4702-	3856- 4407-	4916- 5447-	3218- 3784-	3462- 4028-	4380- 5040-	4436- 5034-	4308- 4956-
ROCHESTER SHALE IRONDEQUOIT DOLOMITE	5166- 5232-	5312- 5380-	5076- 5137-	4677- 4771-	5646- 5752-	4050- 4110-	4296- 4360-	5334- 5402-	5276- 5384-	5242- 5310-
GRIMSBY FORMATION CABOT HEAD SHALE WHIRLPOOL SANDSTONE	5299- 5631- 5460-	5445- 5543- 5616-	5202- 5328- 5365-	4803- 4827- 4960-	5890- 5928- 5965-	4143- 4281- 4314-	4393- 4520- 4563-	5452- 5584- 5624-	5430- 5582- 5606-	5358- 5480- 5533-
QUEENSTON FORMATION	5480-	5680-	5376-	4970-	5974-	4326-	4576-	5638-	5618-	5544-
PRODUCING FORMATION	Medina	Medina	Medina	Medina		Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	5370-5400	5462-5515	5242-5260	4855-4932		4188-4320	4457-4512	5507-5631	5483-5604	5416-5540
TOTAL DEPTH	5370	5687	5447	5132	6096	4444	4720	5731	5745	5630
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	600 Mcf AF 1,450 psi/48 hrs. development Beatty Run pool Cooperstown field	550 Mcf AF 1,150 psi/48 hrs. development Canal McCune Run field	650 Mcf AF 1,100 psi/48 hrs. development Beatty Run pool Cooperstown field	100 Mcf AF 850 psi/48 hrs. development Loucks pool Sugar Grove field	Show of gas Oepper pool To be plugged and abandoned Morrison Run field	800 Mcf AF 1,200 psi/48 hrs. development Whites Run pool Columbus field	516 Mcf AF 1,200 psi/48 hrs. development Oewey Corners pool Columbus field	1,200 Mcf AF 1,200 psi/48 hrs. development Whites Run pool Columbus field	1,500 Mcf AF 1,350 psi/48 hrs. development Campbell Creek pool Goodwill Hill-Grand Valley field	1,500 Mcf AF 1,220 psi/48 hrs. development Campbell Creek pool Goodwill Hill-Grand Valley field

Figure 36. (Continued).

COUNTY Permit Number	Warren 123-3810	Warren 123-38038	Warren 123-38040	Warren 123-38145	Warren 123-38146	Warren 123-38147	Warren 123-38156	Warren 123-38176	Warren 123-38182
NAME OF WELL	Schwab Benedict #1	Arthur Burieligh #10	B. I. Lay #6	Merle Voisin #1	Karne Cherry #1	Stephen Viale #1	J. J. Lamenski #1	Dunlap #1	Arthur Burieligh #14
OPERATOR	Quaker State Oil Refining Corporation	Doran & Associates, Inc. #K-P-97	Berea Oil & Gas Corporation	Quaker State Oil Refining Corporation	Quaker State Oil Refining Corporation	Quaker State Oil Refining Corporation	Quaker State Oil Refining Corporation	Quaker State Oil Refining Corporation	Doran & Associates, Inc. #K-P-96
TOWNSHIP	Southwest	Eldred	Eldred	Eldred	Southwest	Southwest	Southwest	Oerfield	Eldred
QUADRANGLE	Grand Valley	Grand Valley	Spring Creek	Grand Valley	Grand Valley	Grand Valley	Grand Valley	Tidioute	Grand Valley
LATITUDE	10,150 ft. S 41°40'00"	12,800 ft. S 41°45'00"	12,430 ft. S 41°47'30"	15,250 ft. S 41°45'00"	7,900 ft. S 41°40'00"	4,100 ft. S 41°40'00"	6,450 ft. S 41°40'00"	15,000 ft. S 41°45'00"	11,650 ft. S 41°45'00"
LONGITUDE	1,500 ft. W 79°35'00"	4,800 ft. W 79°35'00"	6,820 ft. W 79°35'00"	5,750 ft. W 79°35'00"	2,400 ft. W 79°32'30"	1,200 ft. W 79°35'00"	3,575 ft. W 79°35'00"	3,800 ft. W 79°25'00"	6,100 ft. W 79°35'00"
DATE COMPLETED	7-24-85	6-11-86	7-17-86	12-9-85	12-13-85	12-23-85	1-2-86	2-17-86	6-2-86
ELEVATION	1460 GR	1605 GR	1717 GR	1620 GR	1545 GR	1600 GR	1615 GR	1510 GR	1725 GR
LOGS RECEIVED AND LOGGED INTERVALS	COL/CNL: 0-5663 OLL/GR: 566-5694 SDR: 4880-5560 INT: 3740-5540	COL/CNL: 0-5362 OLL/GR: 566-5362 PCI: 4970-5374 INT: 0-5362	COL/CNL: 0-5362 OLL/GR: 566-5362 PCI: 4970-5374 INT: 0-5362	COL/CNL: 0-5480 OLL/GR: 856-5807 INT: 5200-5450	OLL/GR: 1045-5808 INT: 4260-5680	OLL/GR: 990-5770 INT: 5450-5650	COL/CNL: 0-5795 OLL/GR: 970-5783 INT: 5424-5660	COL/CNL: 0-5619 OLL/GR: 970-5783 INT: 3882-5540	
TULLY LIMESTONE	3776-	3748-	3626-	3708-	3886-	3862-	3884-	3831-	3766-
ONONDAGA LIMESTONE HUNTERSVILLE CHERT	4056-	4016-	3886-	3980-	4172-	4138-	4162-	4103-	4034-
ORISKANY SANDSTONE RIDGELEY SANDSTONE	4172-	3948-	4023-	4112-	4280-	4252-	4282-	4199-	
SILURIAN-DEVONIAN CARBONATES	4195-	3969-	4044-	4120-	4304-	4278-	4308-	4224-	4134-
SALINA GROUP LOCKPORT DOLOMITE	4276- 4958-	4012- 4650-	4088- 4728-	4192- 4844-	4394- 5068-	4352- 5028-	4380- 5040-	4352- 4977-	4170- 4908-
ROCHESTER SHALE IRONDEQUOIT DOLOMITE	5244- 5322-	4904- 5028-	5028- 5104-	5052- 5194-	5294- 5398-	5248- 5394-	5270- 5416-	5204- 5339-	5178- 5253-
GRIMSBY FORMATION CABOT HEAD SHALE WHIRLPOOL SANDSTONE	5372- 5530- 5552-	5048- 5204- 5238-	5112- 5276- 5316-	5242- 5362- 5409-	5480- 5618- 5658-	5445- 5617-	5464- 5600- 5638-	5439- 5528- 5556-	5300- 5426- 5469-
QUEENSTON FORMATION	5560-	5253-	5328-	5420-	5666-	5628-	5646-	5569-	5479-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	5447-5509	5300-5462	5169-5324	5291-5415	5536-5664	5497-5625	5522-5645	5450-5565	5344-5477
TOTAL DEPTH	5688	5622	5466	5537	5794	5754	5678	5645	5657
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	1,400 Mcf AF 1,350 psi/72 hrs. development Kirk pool Enterprise field	574 Mcf AF 1,310 psi/72 hrs. development Three Bridge pool Seikirk field	1,000 Mcf AF 1,250 psi/72 hrs. development Three Bridge pool Seikirk field	875 Mcf AF 1,250 psi/72 hrs. development Three Bridge pool Seikirk field	1,000 Mcf AF 1,290 psi/72 hrs. development Seidman pool Colorado field	1,100 Mcf AF 1,320 psi/72 hrs. development Campbell pool Boodwill Hill-Grand Valley field	1,200 Mcf AF 1,300 psi/72 hrs. development Kirk pool Enterprise field	500 Mcf AF 1,200 psi/72 hrs. development discovery Coburn pool Enterprise field	250 Mcf AF 1,265 psi/72 hrs. development Three Bridge pool Seikirk field

SUMMARIZED RECORDS OF DEEP WELLS

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COUNTY	Warren 123-38223	Warren 123-38461	Warren 123-38463	Warren 123-38507	Warren 123-38531	Warren 123-38572	Warren 123-38583	Warren 123-38589	Warren 123-38591	
NAME OF WELL	Arthur Burleigh #13	Schwab-Erickson #1	Wesley Woods #2	Lawrence Overdorf #1	A. Vroman #1	Roland Hebets #1	M. Z. Lay #12	Ray Shank #1	Huntington-Peterson #1	
OPERATOR	Doran & Associates, Inc. #K-P-103	Quaker State Oil Refining Corporation	Quaker State Oil Refining Corporation	Quaker State Oil Refining Corporation	Quaker State Oil Refining Corporation	Quaker State Oil Refining Corporation	Berea Oil & Gas Corporation	Quaker State Oil Refining Corporation	Quaker State Oil Refining Corporation	
TOWNSHIP	Eldred	Southwest	Eldred	Southwest	Eldred	Eldred	Eldred	Southwest	Southwest	
QUADRANGLE	Grand Valley	Grand Valley	Spring Creek	Grand Valley	Grand Valley	Grand Valley	Spring Creek	Grand Valley	Grand Valley	
LATITUDE	10,150 ft. S 41°45'00"	8,750 ft. S 41°40'00"	13,500 ft. S 41°47'30"	2,400 ft. S 41°40'00"	11,700 ft. S 41°45'00"	5,200 ft. S 41°45'00"	11,580 ft. S 41°47'30"	14,600 ft. S 41°42'30"	14,400 ft. S 41°42'30"	
LONGITUDE	4,350 ft. W 79°35'00"	9,000 ft. W 79°32'30"	1,250 ft. W 79°32'30"	5,975 ft. W 79°35'00"	4,100 ft. W 79°35'00"	7,000 ft. W 79°35'00"	1,825 ft. W 79°35'00"	4,700 ft. W 79°30'00"	2,300 ft. W 79°30'00"	
DATE COMPLETED	7-8-86	1-11-86	1-18-86	1-26-86	2-19-86	11-11-86	6-22-86	3-4-86	2-15-87	
ELEVATION	1680 GR	1470 GR	1580 GR	1290 GR	1680 GR	1722 GR	1715 GR	1500 GR	1570 GR	
LOGS RECEIVED AND LOGGED INTERVALS	CDL/CNL: 0-5572 DLL/GR: 796-5590 INT: 5190-5450	CDL/GR: 0-5682	CDL/GR: 0-5374	CDL/GR: 0-5414			CDL/GR: 0-5776			
TULLY LIMESTONE	3720-	3786-	3576-	3518-	3755-	3695-	3643-	3860-	3963-	
ONONDAGA LIMESTONE HUNTERSVILLE CHERT	3988-	4066-	3850-	3796-	4025-	3959-	3908-	4144-	4200-	
ORISKANY SANDSTONE RIDGELEY SANDSTONE		4178-	3973-	3912-	4112- Bols Blanc	4074- Bols Blanc	4040-	4252-	4302-	
SILURIAN-DEVONIAN CARBONATES	4089-	4203-	3978-	3938-	4160-	4101-	4059-	4274-	4328-	
SALINA GROUP LOCKPORT DOLOMITE	4126- 4862-	4280- 4952-	4034- 4696-	4009- 4692-	4257- 4894-	4222- 4818-	4106- 4736-	4360- 5050-	4463- 5055-	
ROCHESTER SHALE IRONDEQUOIT DOLOMITE	5134- 5206-	5204- 5320-	4978- 5042-	4908- 5050-	5109- 5245-	5026- 5165-	5032- 5114-	5272- 5412-	5296- 5431-	
GRIMSBY FORMATION CAROT HEAD SHALE WHIRLPOOL SANDSTONE	5254- 5376- 5420-	5384- 5512- 5550-	5085- 5238- 5261-	5101- 5232- 5271-	5340- 5419- 5460-	5208- 5347- 5379-	5124- 5290- 5326-	5458- 5610- 5642-	5480- 5624- 5654-	
QUEENSTON FORMATION	5432-	5558-	5273-	5282-	5471-	5390-	5338-	5651-	5730-	
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	
PRODUCING INTERVAL	5308-5430	5434-5557	5146-5270	5170-5279	5303-5470	5254-5385	5206-5288	5516-5650	5531-5662	
TOTAL DEPTH	5638	5648	5366	5426	5603	5534	5501	5785	5828	
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	
RESULTS	400 Mcf AF 1,325 psi/72 hrs. development Three Bridge pool Selkirk field	1,500 Mcf AF 1,250 psi/48 hrs. development Kirkman pool Enterprise field	1,200 Mcf AF 1,330 psi/48 hrs. development Trim pool Sanford field	1,200 Mcf AF 1,330 psi/48 hrs. development Campbell Creek pool Goodwill Hill-Grand Valley field	1,600 Mcf AF 1,330 psi/48 hrs. development Three Bridge pool Selkirk field	1,000 Mcf AF 1,250 psi/48 hrs. development Three Bridge pool Selkirk field	1,250 Mcf AF 1,350 psi/72 hrs. development Three Bridge pool Selkirk field	1,500 Mcf AF 1,250 psi/48 hrs. development Seldom Seen pool Colorado field	1,200 Mcf AF 1,100 psi/48 hrs. extension Seldom Seen pool Colorado field	1,600 Mcf AF 1,200 psi/48 hrs. development Seldom Seen pool Colorado field

Figure 36. (Continued).

COUNTY Permit Number	Warren 123-38642	Warren 123-38900	Warren 123-39111	Warren 123-39112	Warren 123-39218	Warren 123-39274	Warren 123-39326	Warren 123-39365	Warren 123-39404	Warren 123-39435	
NAME OF WELL	Huntington-Lindquist #1	Carl Still #1	Archie Woodin #1	John Woodin #2	L. Crosby #1	M. Halliday #2	Dodd #1	Henry Stec #1	Arthur Burleigh #15	Frank Nichols #2	
OPERATOR	Quaker State Oil Refining Corporation	N.E.A. Cross Company	N.E.A. Cross Company	N.E.A. Cross Company	U. S. Energy Development Corp.	U. S. Energy Development Corp.	Pine Valley Resources, Inc.	Quaker State Oil Refining Corporation	Doran & Associates, Inc. #K-P-104	Berea Oil & Gas Corporation	
TOWNSHIP	Southwest	Columbus	Freehold	Freehold	Bear Lake	Freehold	Columbus	Southwest	Eldred	Eldred	
QUADRANGLE	Grand Valley	Columbus	Lottsville	Lottsville	Lottsville	Lottsville	Columbus	Grand Valley	Grand Valley	Spring Creek	
LATITUDE	9,200 ft. S 41°42'30"	1,950 ft. S 41°57'30"	14,700 ft. S 42°00'00"	300 ft. S 41°57'30"	3,400 ft. S 42°00'00"	9,300 ft. S 42°00'00"	9,100 ft. S 41°57'30"	13,400 ft. S 41°40'00"	8,500 ft. S 41°45'00"	5,177 ft. S 41°47'30"	
LONGITUDE	4,800 ft. W 79°30'00"	7,400 ft. W 79°30'00"	800 ft. W 79°27'30"	9,800 ft. W 79°25'00"	11,100 ft. W 79°27'30"	10,900 ft. W 79°27'30"	4,150 ft. W 79°35'00"	11,625 ft. W 79°30'00"	6,600 ft. W 79°35'00"	7,631 ft. W 79°35'00"	
DATE COMPLETED	1-31-87	9-8-84	9-25-84	9-17-84	10-6-84	10-17-84	3-26-86	10-24-86	8-23-86	7-10-86	
ELEVATION	1480 GR	1440 GR	1510 GR	1410 GR	1575 GR	1759 GR	1419 GR	1535 GR	1610 GR	1680 GR	
LOGS RECEIVED AND LOGGED INTERVALS		COL/GR: 2750-4462	COL/GR: 2800-4650	COL/GR: 2800-4580	COL/CNL: 2800-4558 DIL/GR: 2800-4558	COL/CNL: 2800-4811 OIL/GR: 2800-4805	COL/CNL: 2700-4486		COL/CNL: 834-5489 OIL/GR: 834-5477 INT: 5100-5350		
TULLY LIMESTONE	3744-	2758-	2884-	2820-	2820-	3064-	2770-	3917-	3628-	3512-	
ONONDAGA LIMESTONE HUNTERSVILLE CHERT	4035	3038-	3166-	3100-	3102-	3350-	3046-	4198-	3898-	3770-	
ORISKANY SANDSTONE RIDGELEY SANDSTONE	4140-		3333-	3264-	3278-	3524-		4310-		3912-	
SILURIAN-DEVONIAN CARBONATES	4164-	3204-	3349-	3272-	3290-	3578-	3224-	4330-	4000-	3930-	
SALINA GROUP LOCKPORT DOLOMITE	4297- 4892-	3272- 3840-	3390- 3984-	3320- 3892-	3338- 3900-	3580- 4142-	3286- 3866-	4476- 5116-	4038- 4776-	3973- 4600-	
ROCHESTER SHALE IRONDEQUOIT DOLOMITE	5130- 5264-	4107- 4170-	4214- 4296-	4150- 4230-	4157- 4232-	4396- 4470-	4136- 4198-	5356- 5482-	5036- 5112-	4876- 4970-	
GRIMSBY FORMATION CABOT HEAD SHALE WHIRLPOOL SANDSTONE	5314- 5456- 5489-	4208- 4334- 4374-	4333- 4464- 4500-	4265- 4312- 4432-	4268- 4406- 4434-	4508- 4628- 4672-	4242- 4352- 4404-	5536- 5667- 5713-	5162- 5282- 5328-	4980- 5144- 5184-	
QUEENSTON FORMATION	5502-	4388-	4514-	4444-	4448-	4692-	4410-	5718-	5339-	5196-	
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	
PRODUCING INTERVAL	5383-5495	4282-4328	4423-4462	4370-4387	4311-4440	4520-4689	4292-4363	5595-5716	5209-5334	5064-5190	
TOTAL DEPTH	5637	4500	4661	4595	4572	4812	4540	5840	5462	5303	
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	
RESULTS	1,000 Mcf AF 1,200 psi/168 hrs. development Campbell Creek pool Goodwill Hill-Grand Valley field	1,700 Mcf AF 1,100 psi/48 hrs. development Dewey Corners pool Columbus field	500 Mcf AF 1,150 psi/48 hrs. development Dewey Corners pool Columbus field	1,500 Mcf AF 1,150 psi/48 hrs. development Dewey Corners pool Columbus field	1,024 Mcf AF 1,200 psi/72 hrs. development Dewey Corners pool Columbus field	1,929 Mcf AF 1,175 psi/72 hrs. development Dewey Corners pool Columbus field	200 Mcf Nat. 2,100 Mcf AF 1,200 psi/72 hrs. development Hare Creek pool Columbus field	200 Mcf Nat. 2,100 Mcf AF 1,200 psi/72 hrs. development Hare Creek pool Columbus field	1,145 Mcf AF 1,200 psi/48 hrs. development Selden Seen Colorado field	400 Mcf AF 1,325 psi/72 hrs. development Three Bridge pool Selkirk field	1,500 Mcf AF 1,300 psi/72 hrs. development Columbia County Line field

COUNTY Permit Number	Warren 123-39436	Warren 123-39457	Warren 123-39461	Warren 123-39462	Warren 123-39481	Warren 123-39505	Warren 123-39506	Warren 123-39507	Warren 123-39509	Warren 123-39510
NAME OF WELL	Orren Smith #3	Hammermill #1	Lee Oil & Gas #2	Cochran-Allen #1	Wright Brothers #2	Rensma-Walker #1	Nichols-Strite #1	North Philadelphia #1	Englemeyer-Hopkins #1	Wesley Woods #3
OPERATOR	Berea Oil & Gas Corporation	Ooran & Associates, Inc. #K-P-102	Ooran & Associates, Inc. #K-2-66	Quaker State Oil Refining Corporation	Quaker State Oil Refining Corporation	Quaker State Oil Refining Corporation	Quaker State Oil Refining Corporation	Quaker State Oil Refining Corporation	Quaker State Oil Refining Corporation	Quaker State Oil Refining Corporation
TOWNSHIP	Eldred	Southwest	Eldred	Eldred	Southwest	Eldred	Triumph	Southwest	Southwest	Eldred
QUADRANGLE	Spring Creek	Grand Valley	Grand Valley	Grand Valley	Grand Valley	Grand Valley	Tidiloute	Grand Valley	Grand Valley	Grand Valley
LATITUDE	41°31'00" S 41°47'30" S	11°40'00" S 41°42'30" S	5°27'00" S 41°45'00" S	7°15'00" S 41°45'00" S	11°70'00" S 41°42'30" S	13°22'00" S 41°45'00" S	6°50'00" S 41°42'30" S	1°18'00" S 41°42'30" S	1°57'00" S 41°40'00" S	6°10'00" S 41°45'00" S
LONGITUDE	59°35'00" W 79°35'00" W	1°30'00" W 79°35'00" W	31°0'00" W 79°35'00" W	8°02'00" W 79°32'30" W	7°50'00" W 79°32'30" W	3°45'00" W 79°35'00" W	9°30'00" W 79°27'30" W	57°0'00" W 79°30'00" W	5°40'00" W 79°32'30" W	9°85'00" W 79°30'00" W
DATE COMPLETED	7-7-86	8-9-86	12-28-86	10-22-86	11-2-86	11-20-86	2-22-87	12-5-86	10-16-86	10-31-86
ELEVATION	1675 GR	1264 GR	1480 GR	1600 GR	1470 GR	1725 GR	1610 GR	1580 GR	1650 GR	1712 GR
LOGS RECEIVED AND LOGGED INTERVALS		COL/CNL: 95-5318 INT: 3650-5280	COL/CNL: 782-5302 OLL/GR: 782-5288 INT: 5010-5203							
TULLY LIMESTONE	3521-	3442-	3500-	3663-	3718-	3802-	3859-	3792-	3919-	3724-
ONONDAGA LIMESTONE HUNTERSVILLE CHERT	3786-	3718-	3768-	3936-	4003	4073-	4144-	4082	4203-	3998-
ORISKANY SANDSTONE RIOGEELEY SANDSTONE	3932-			4036- Bois Blanc	4110-	4172- Bois Blanc	4243-	4182-	4318-	4094- Bois Blanc
SILURIAN-DEVONIAN CARBONATES	3952-	3824-	3872-	4069-	4134-	4212-	4260-	4200-	4346-	4129-
SALINA GROUP LOCKPORT DOLOMITE	4000- 4610-	3874- 4616-	3905- 4626-	4174- 4785-	4260- 4877-	4323- 4940-	4387- 4984-	4325- 4920-	4468- 5096-	4231- 4854-
ROCHESTER SHALE IRONDEQUOIT DOLOMITE	4880- 4985-	4888- 4960-	4900- 4972-	5002- 5133-	5095- 5232-	5182- 5292-	5207- 5341-	5141- 5274-	5320- 5454-	5070- 5202-
GRIMSBY FORMATION CABOT HEAD SHALE WHIRLPOOL SANDSTONE	4995- 5170- 5196-	5003- 5150- 5180-	5016- 5160- 5187-	5180- 5308- 5350-	5280- 5422- 5456-	5340- 5467- 5506-	5392- 5536- 5560-	5334- 5474- 5496-	5505- 5653- 5683-	5246- 5388- 5418-
QUEENSTON FORMATION	5208-	5190-	5198-	5362-	5469-	5518-	5574-	5510-	5696-	5430-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	5044-5203	5060-5185	5047-5194	5233-5359	5330-5466	5356-5516	5453-5570	5379-5506	5559-5691	5298-5427
TOTAL DEPTH	5371	5351	5314	5504	5626	5646	5650	5630	5812	5778
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	1,200 Mcf AF 1,300 psi/72 hrs. development County Line field	5,400 Mcf AF 1,396 psi/72 hrs. development Campbell Creek pool Goodwill Hill-Grand Valley field	1,200 Mcf AF 1,360 psi/72 hrs. development Three Bridge pool Selkirk field	1,300 Mcf AF 1,225 psi/48 hrs. extension Trim Sanford field	1,600 Mcf AF 1,295 psi/48 hrs. development Campbell Creek pool Goodwill Hill-Grand Valley field	1,100 Mcf AF 1,100 psi/48 hrs. development Three Bridge pool Selkirk field	1,100 Mcf AF 900 psi/168 hrs. extension Campbell Creek pool Goodwill Hill-Grand Valley field	1,300 Mcf AF 1,300 psi/48 hrs. development Campbell Creek pool Goodwill Hill-Grand Valley field	1,500 Mcf AF 1,100 psi/48 hrs. development Campbell Creek pool Goodwill Hill-Grand Valley field	1,600 Mcf AF 1,300 psi/48 hrs. development Trim pool Goodwill Hill-Grand Valley field

Figure 36. (Continued).

COUNTY Permit Number	Warren 123-39511	Warren 123-39513	Warren 123-39519	Warren 123-39565	Warren 123-39587	Warren 123-39626	Warren 123-39643	Warren 123-39656	Warren 123-39657	Warren 123-39658
NAME OF WELL	Robert Watson #1	Rensma-Oelo #1	E. Reynolds #2	Clarence Burrows #1	John Nemunaitis #1	Homer Nevel #2	Merle B. Sutton #1-B	Speth-Maginnis #1	J. Hook #1	Coleman-Smith #1
OPERATOR	Quaker State Oil Refining Corporation	Quaker State Oil Refining Corporation	Quaker State Oil Refining Corporation	Doran & Associates, Inc. #K-P-101	Quaker State Oil Refining Corporation	Quaker State Oil Refining Corporation	Doran & Associates, Inc. #K-J-36	Doran & Associates, Inc. #K-P-118	Doran & Associates, Inc. #K-P-117	Doran & Associates, Inc. #K-P-119
TOWNSHIP	Southwest	Southwest	Eldred	Southwest	Eldred	Eldred	Southwest	Eldred	Southwest	Southwest
QUADRANGLE	Grand Valley	Grand Valley	Spring Creek	Grand Valley	Spring Creek	Spring Creek	Grand Valley	Grand Valley	Grand Valley	Grand Valley
LATITUDE	14,000 ft. S 41°42'30"	12,850 ft. S 41°40'00"	14,480 ft. S 41°47'30"	13,600 ft. S 41°42'30"	5,050 ft. S 41°47'30"	8,070 ft. S 41°47'30"	3,980 ft. S 41°42'30"	2,700 ft. S 41°45'00"	350 ft. S 41°40'00"	3,710 ft. S 41°42'30"
LONGITUDE	10,020 ft. W 79°32'30"	10,600 ft. W 79°32'30"	11,320 ft. W 79°30'00"	7,370 ft. W 79°35'00"	700 ft. W 79°30'00"	4,310 ft. W 79°32'30"	2,580 ft. W 79°35'00"	6,030 ft. W 79°35'00"	7,370 ft. W 79°35'00"	5,600 ft. W 79°35'00"
DATE COMPLETED	11-26-86	11-15-86	11-6-86	11-5-86	11-12-86	3-1-87	1-6-87	1-25-87	2-9-87	2-15-87
ELEVATION	1610 GR	1290 GR	1710 GR	1568 GR	1660 GR	1540 GR	1640 GR	1652 GR	1482 GR	1460 GR
LOGS RECEIVED AND LOGGED INTERVALS				COL/CNL: 830-5610 OIL/GR: 830-5596 INT: 4135-5520			COL/CNL: 0-5623 OIL/GR: 0-5623 INT: 4100-5600	COL/CNL: 847-5447	COL/CNL: 732-5661	COL/CNL: 0-5398
TULLY LIMESTONE	3840-	3608-	3711-	3742-	3616-	2341-	3753-	3614-	3760-	3552-
ONONDAGA LIMESTONE HUNTERSVILLE CHERT	4120-	3893-	3983-	4014-	3905-	3721-	4022-	3882-	4034-	3824-
ORISKANY SANDSTONE RIDGELEY SANDSTONE	4236-	4010-	4086- Bois Blanc	4138-	4013- Bois Blanc	3827- Bois Blanc	4148-	4028-	4154-	3950-
SILURIAN-DEVONIAN CARBONATES	4258-	4029-	4108-	4161-	4033-	3854-	4163-	4046-	4248-	3966-
SALINA GROUP LOCKPORT DOLOMITE	4383- 5020-	4167- 4810-	4200- 4936-	4232- 4938-	4141- 4764-	3962- 4519-	4230- 4906-	4098- 4738-	4250- 4934-	4030- 4754-
ROCHESTER SHALE IRONDEQUOIT DOLOMITE	5240- 5377-	5047- 5181-	5048- 5182-	5210- 5289-	4980- 5110-	4815- 4925-	5194- 5264-	5011- 5074-	5225- 5296-	4996- 5060-
GRIMSBY FORMATION CABOT HEAD SHALE WHIRLPOOL SANDSTONE	5422- 5565- 5596-	5232- 5379- 5410-	5226- 5364- 5400-	5336- 5473- 5506-	5154- 5295- 5327-	4970- 5111- 5139-	5286- 5430- 5474-	5113- 5263- 5288-	5343- 5482- 5512-	5103- 5230- 5274-
QUEENSTON FORMATION	5608-	5418-	5411-	5517-	5336-	5148-	5487-	5296-	5522-	5286-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	5471-5606	5292-5382	5274-5408	5393-5514	5292-5334	5017-5145	5366-5481	5190-5246	5419-5518	5166-5281
TOTAL DEPTH	5730	5553	5567	5614	5459	5266	5655	5449	5697	5444
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	1,400 Mcf AF 1,400 psi/48 hrs. development Campbell Creek pool Goodwill Hill-Grand Valley field	1,400 Mcf AF 1,450 psi/48 hrs. development Enterprise pool field	1,400 Mcf AF 1,250 psi/48 hrs. development Trim Sanford field	2,100 Mcf AF 1,407 psi/72 hrs. deeper pool discovery Porky Run pool Ootyville field	1,000 Mcf AF 1,100 psi/48 hrs. development Trim Sanford field	1,800 Mcf AF 1,240 psi/168 hrs. development Trim Sanford field	400 Mcf AF 1,240 psi/72 hrs. extension Campbell Creek pool Goodwill Hill-Grand Valley field	1,000 Mcf AF 1,375 psi/72 hrs. development Three Bridge pool Serkirk field	775 Mcf AF 1,355 psi/72 hrs. development Porky Run pool Ootyville field	190 Mcf AF 1,355 psi/72 hrs. extension Porky Run pool Ootyville field

SUMMARIZED RECORDS OF DEEP WELLS

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COUNTY Permit Number	Warren 123-39681	Warren 123-39682	Warren 123-39683	Warren 123-39684	Warren 123-39699	Warren 123-39700	Warren 123-39702	Warren 123-39709	Westmoreland 129-22910
NAME OF WELL	Victor Morris #1	K. Kimmy #1	R. McGraw #2	V. Morris #2	A. Kuzma Estate #2	Eugene Harris #3	Eugene Harris #1	R. McGraw #1	R. L. Shuster #1
OPERATOR	Douglas Oil & Gas, Inc.	Douglas Oil & Gas, Inc.	Douglas Oil & Gas, Inc.	Douglas Oil & Gas, Inc.	Eastern States Energy, Inc.	Eastern States Energy, Inc.	Eastern States Energy, Inc.	Douglas Oil & Gas, Inc.	CNG Development Corp. #2538
TOWNSHIP	Eldred	Eldred	Eldred	Eldred	Columbus	Columbus	Columbus	Eldred	Salem
QUADRANGLE	Spring Creek	Spring Creek	Spring Creek	Spring Creek	Columbus	Columbus	Columbus	Spring Creek	Slackville
LATITUDE	8,465 ft. S 41°47'30"	7,430 ft. S 41°47'30"	12,500 ft. S 41°47'30"	7,250 ft. S 41°47'30"	13,250 ft. S 41°57'30"	12,800 ft. S 41°57'30"	11,550 ft. S 41°57'30"	9,015 ft. S 41°47'30"	13,200 ft. S 40°25'00"
LONGITUDE	11,220 ft. W 79°32'30"	8,350 ft. W 79°32'30"	9,550 ft. W 79°32'30"	10,100 ft. W 79°32'30"	5,350 ft. W 79°32'30"	7,320 ft. W 79°32'30"	6,100 ft. W 79°32'30"	8,110 ft. W 79°32'30"	8,300 ft. W 79°32'30"
DATE COMPLETED	2-23-87	3-12-87	3-1-87	3-7-87	3-5-87	3-9-87	3-16-87	3-18-87	12-27-86
ELEVATION	1650 GR	1770 GR	1530 GR	1750 GR	1820 GR	1605 GR	1555 GR	1730 GR	1348 GR
LOGS RECEIVED AND LOGGED INTERVALS					CDL/CNL: 650-4972 DLL/GR: 1100-4990	CDL/CNL: 0-4632 DLL/GR: 1445-4650	CDL/CNL: 0-4633 DLL/GR: 1883-4654		CDL/CNL: 2300-7800
TULLY LIMESTONE	3548-	3666-	3493-	3638-	3256-	3008-	2890-	3646-	6971-
ONONDAGA LIMESTONE HUNTERSVILLE CHERT	3814-	3931-	3764-	3904-	3546-	3286-	3167-	3911-	7478- 7496-
ORISKANY SANDSTONE RIDGELEY SANDSTONE		4060- Bois Blanc	3890- Bois Blanc	4034- Bois Blanc	3705-			4037- Bois Blanc	7662-
SILURIAN-DEVONIAN CARBONATES		4071-	3904-	4049-	3728-	3486-	3330-	4046-	7712-
SALINA GROUP LOCKPORT DOLOMITE		4136- 4793-	3970- 4619-	4109- 4763-	3774- 4354-	3514- 4090-	3398- 3970-	4108- 4763-	
ROCHESTER SHALE IRONDEQUOIT DOLOMITE		5086- 5140-	4900- 4964-	5056- 5109-	4602- 4688-	4358- 4422-	4240- 4302-	5046- 5109-	
GRIMSBY FORMATION CAROT HEAD SHALE WHIRLPOOL SANDSTONE		5185- 5316- 5352-	5014- 5149- 5178-	5157- 5281- 5317-	4722- 4850- 4898-	4460- 4594- 4626-	4344- 4476- 4506-	5155- 5288- 5320-	
QUEENSTON FORMATION	5239-	5360-	5189-	5328-	4910-	4637-	4518-	5333-	
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	2954-3500
PRODUCING INTERVAL	5113-5234	5228-5357	5065-5183	5187-5324	4779-4907	4527-4635	4382-4516	5192-5327	Bradford
TOTAL DEPTH	5370	5498	5340	5466	5027	4790	4704	5496	7826
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Shriver
RESULTS	800 Mcf AF 1,100 psi/48 hrs. development Trim Sanford field	1,000 Mcf AF 1,250 psi/48 hrs. development Trim Sanford field	900 Mcf AF 1,200 psi/48 hrs. development Three Bridge pool Selkirk field	750 Mcf AF 1,100 psi/48 hrs. development Trim pool Sanford field	950 Mcf AF 1,090 psi/24 hrs. development Whites Run pool Columbus field	900 Mcf AF 1,080 psi/24 hrs. development Whites Run pool Columbus field	1,050 Mcf AF 1,130 psi/24 hrs. development Whites Run pool Columbus field	500 Mcf AF 1,350 psi/72 hrs. development Trim pool Sanford field	335 Mcf AF dry deeper pool test, producing shallow Oakford Storage pool Oakford field

